WWI

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Soldiers burned from inside out

Chemists struggled to perfect the deadliest gas weapons

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Generals sent infantry to certain death

+

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DEATH IN THE TRENCHES

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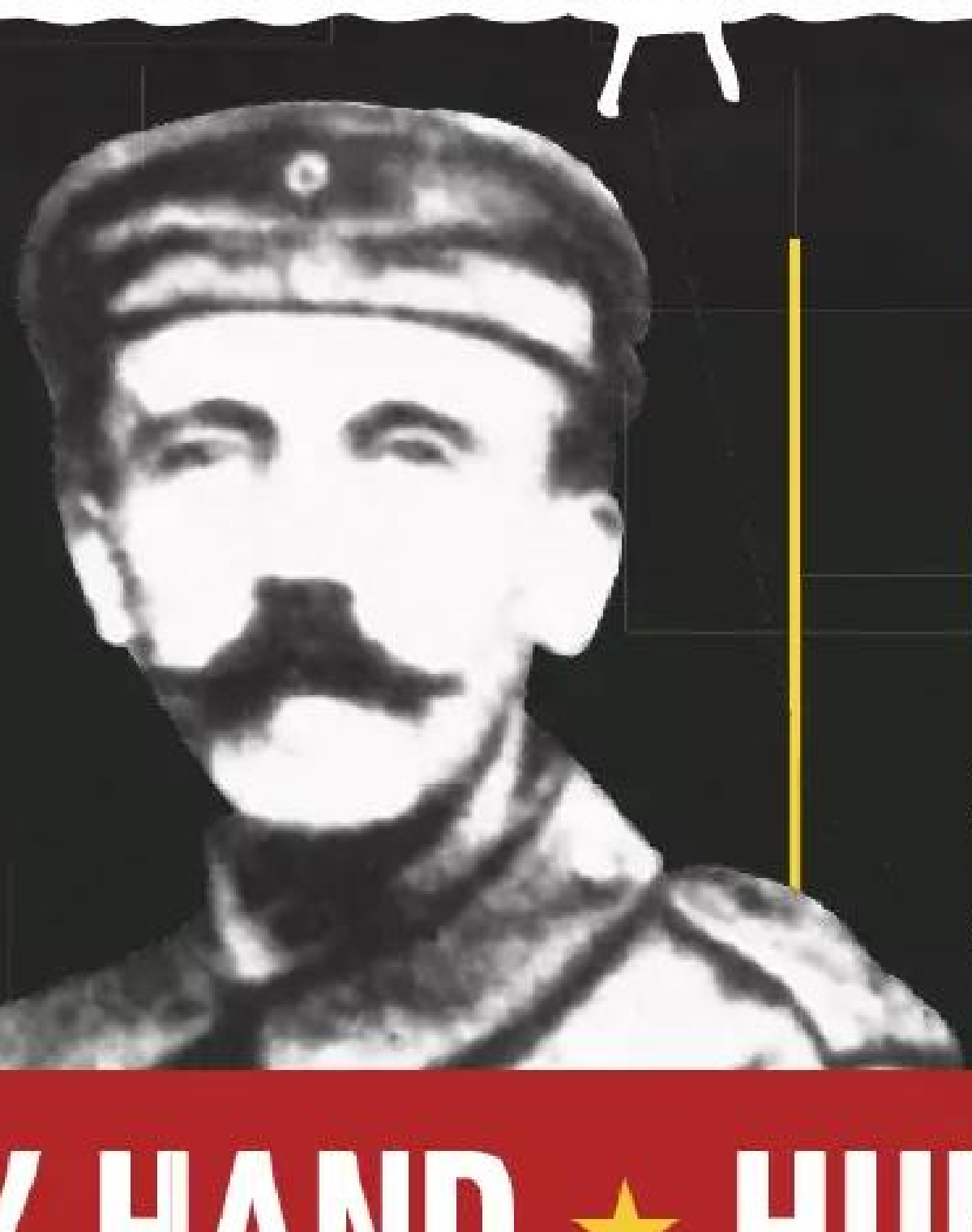
HITLER AWARDED TWO MEDALS

Future dictator developed ideas for next war



DEATH ARRIVED ON TRACKS

30 tonnes of armour sent scared Germans on the run

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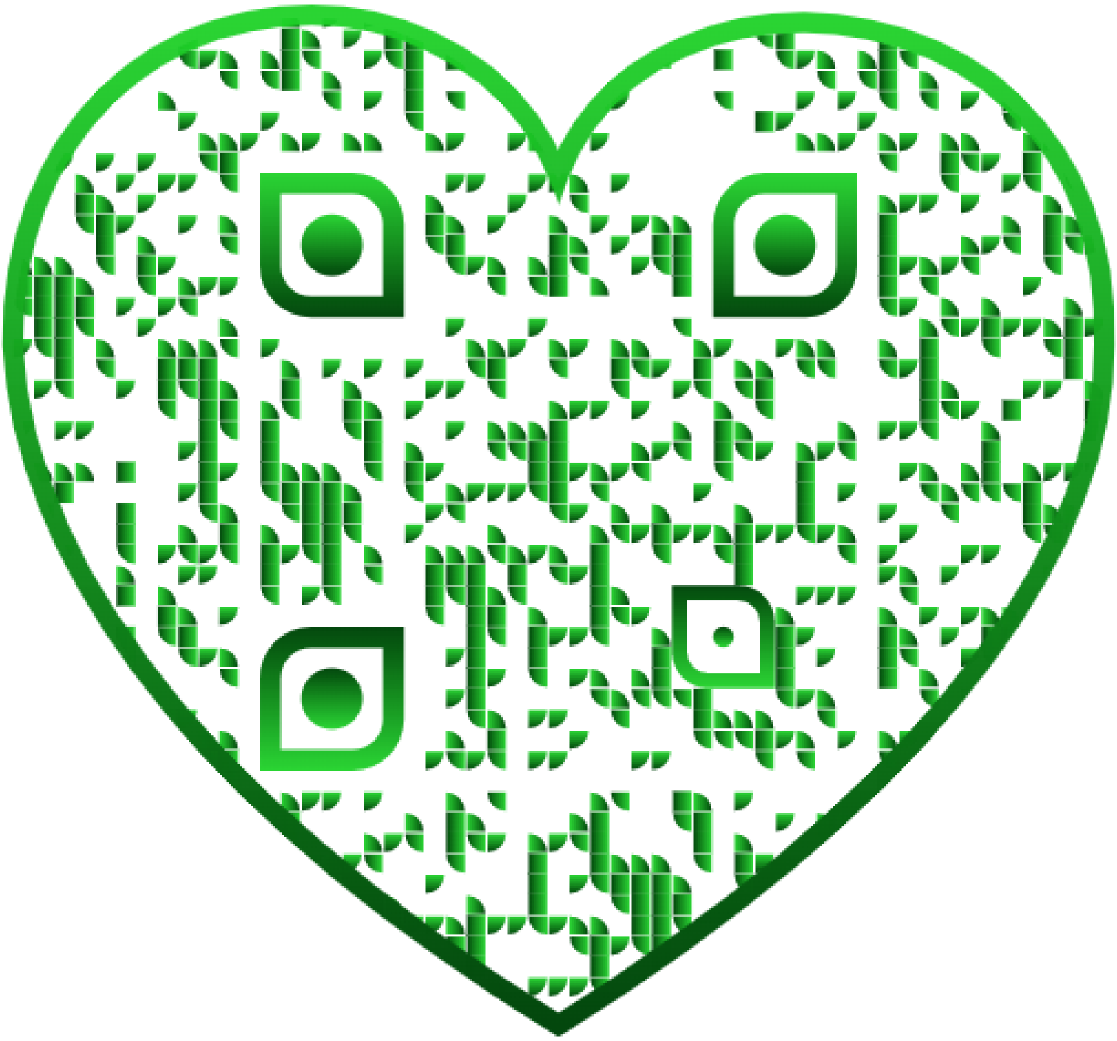
PILOTS DROPPED BOMBS BY HAND ★ HUNGRY CIVILIANS ATE HORSES AND RATS



WAR GOT STUCK IN THE MUD

The showdown should have been a brief affair, where the German Empire put its neighbours in their place. Encouraged by the spirit of adventure thousands of young men volunteered to defend the nation's honour. On the other hand, in France, Britain and Russia optimism was just as high: the troops would be home by Christmas. But the reality was quite different. Soon the lines were locked in a deadly mud hell in the heart of Europe, and despite new weapons like poison gas, submarines, tanks and aircraft the war was protracted. The first signs of events turning came when the US entered the war in 1917. The arrival of fresh American forces turned the war in the Allies' favour. The Germans were beaten, and with the defeat came more misery: civilians were starving, and revolution brewed under the surface. "Death in the Trenches" follows World War I, which divided a continent and cost millions of young men their lives.

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Page 52 In unsanitary field hospitals, just behind the front, intrepid nurses and doctors fought against the odds to save both friend and foe.

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10. WAR LOGISTICS

Page 88 A network of ships, trains, trucks and horses were used to transport men, weapons and food to the front, while the wounded were taken the other way.

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3. THREAT FROM THE SEAS

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1915-1918

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Page 44 When the first tanks rolled on the scene in the spring of 1916, the experience was just unpleasant for those inside the steel contraptions as the men they targeted.

DEATH IN THE MUD
1917

7. DEATH IN THE MUD

Page 60 Millions of men died in the trenches' mud hell – over half a million alone in what became known as the Battle of Passchendaele.

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8. THE AIR WAR'S INFANCY

Page 72 History's first air duels were fought with small arms and missiles. But soon all-new fighter planes equipped with machine guns took to the air.

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Page 82 An blockade of commercial vessels combined with a failed potato harvest left starving German civilians who soon lost faith in their Kaiser.

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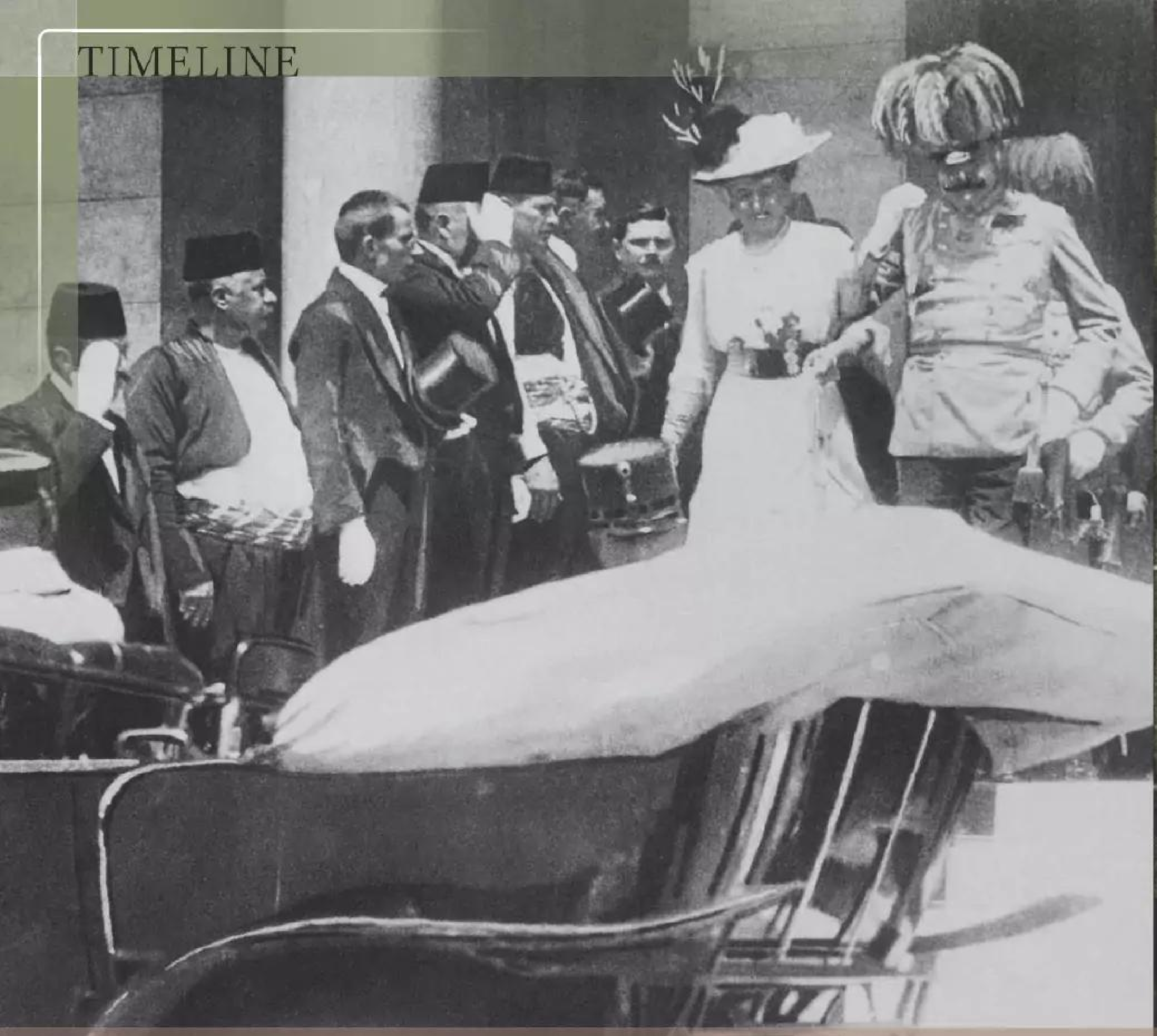
12. USA TURNS THE WAR

Page 104 A secret telegram and unrestricted submarine warfare prompted the US to enter the war in 1917, turning it decisively in favour of the Entente Powers.

TRACES LEFT BEHIND
1919-2003

13. TRACES LEFT BEHIND

Page 114 The ancient battlefields in Europe are still rich in traces of the horrors of war, and are diligently explored by tourists and archaeologists.



1914 // *Gavrilo Princip murders Franz Ferdinand*

Ausflug nach Paris
Auf Wiedersehn auf dem Boulevard
in den Kampf mir juckt die Säbelspitz

1914 // *Germany declares war on Russia and France*

1914 // *German victory at Tannenberg*

1915 // *German scientist Fritz Haber invents a deadly poison gas*

1914-1915

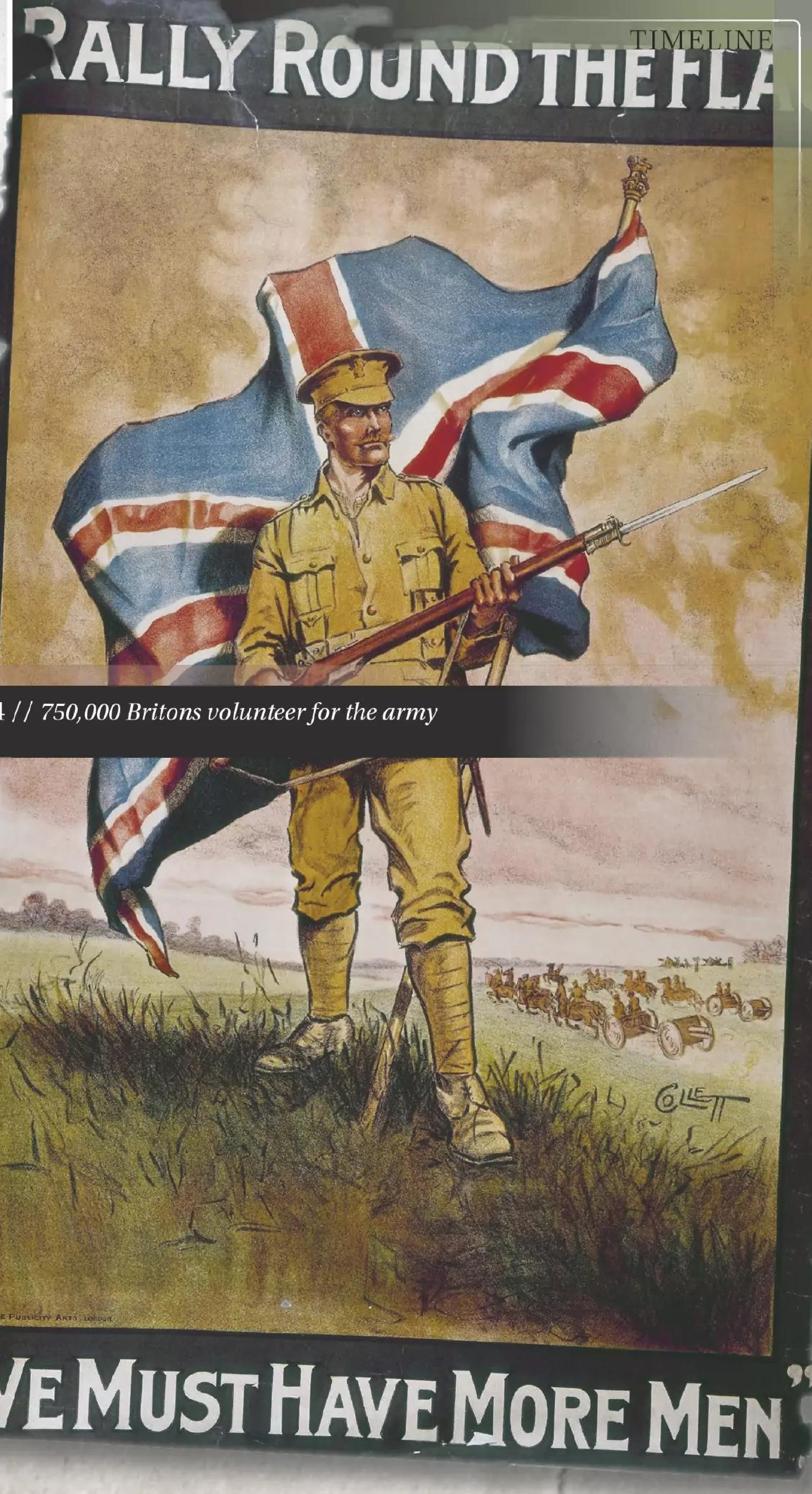
THE SHOT IN SARAJEVO

1914 On 28th June, heir to the Austro-Hungarian throne, Franz Ferdinand and his wife Sophie visit Bosnia's capital, Sarajevo. The couple travel through town by car with the top down, so that people can see them. The country is part of the Austro-Hungarian empire, but the large Serb minority want to belong to Serbia. 19-year-old Serb nationalist Gavrilo Princip launches forward and assassinates the couple. Austria-Hungary could not prove that Serbia was behind the murder, yet declared war on 28th July. Russia stands behind Serbia. Austria-Hungary's ally Germany first declares war on Russia and then on its ally France.

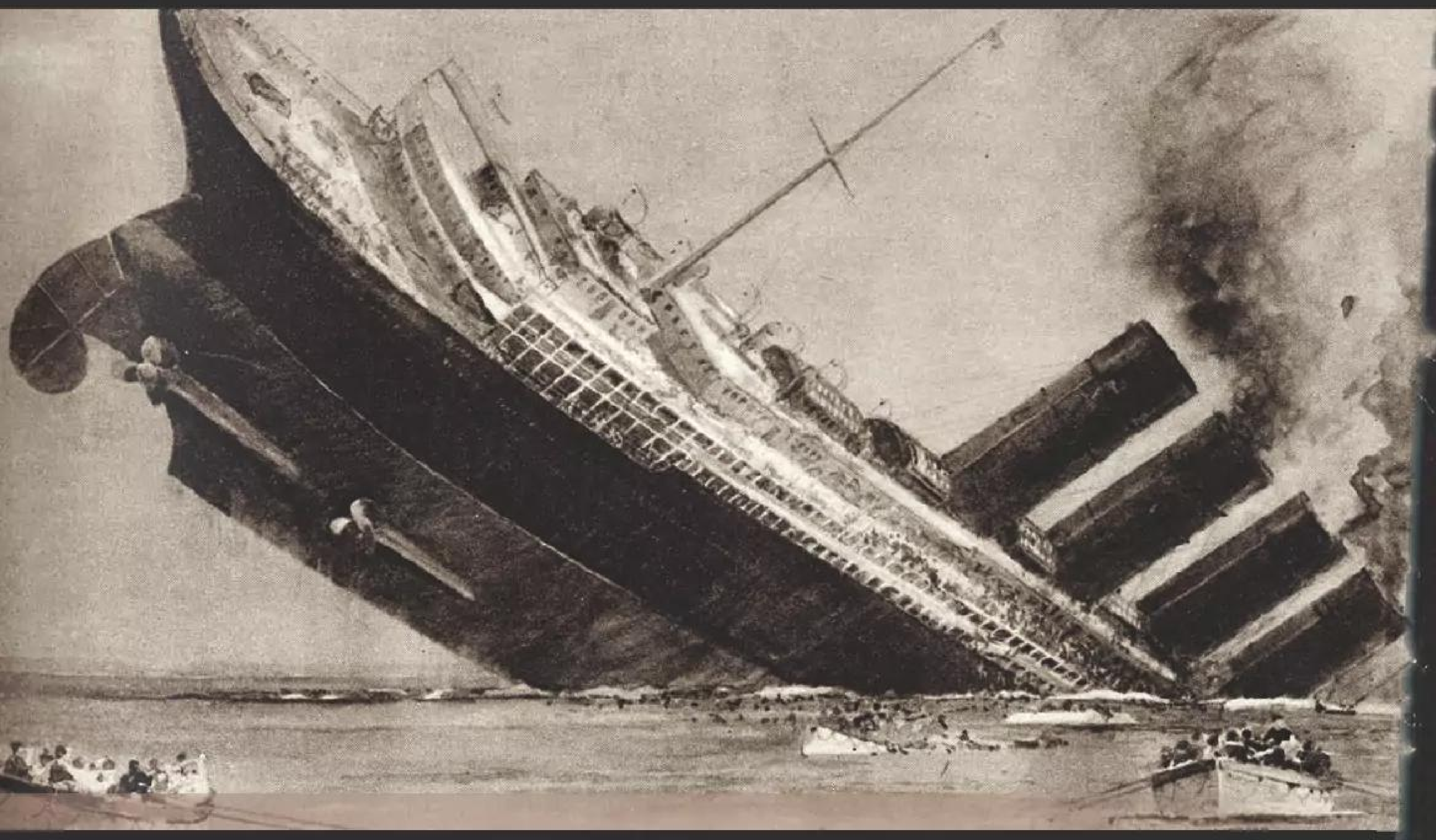
EASTERN FRONT'S FIRST BATTLE

1914 On 1st August Germany declares war on Russia, on the 3rd it declares war on France and starts by invading Belgium on the 4th, leading Britain to declare war on Germany. The Germans have opened fronts on both the east and west. On 17th August Russia invades East Prussia, but General Samsonov's Russian 2nd Army is lured into a trap. Newly appointed German commander Paul von Hindenburg believes attack is the best defence. On 26th-29th August the German 8th Army crushes Russian troops at Tannenberg. The Russians lose 125,000 men, and Samsonov commits suicide. On 14th September, the Germans force the last Russian troops away from the Eastern Front.

1914 // *Ludendorff and von Hindenburg attack Russian troops*



1914 // *750,000 Britons volunteer for the army*



1915 // *German U-boat sinks Lusitania*

WESTERN FRONT GRINDS TO HALT

1915 The German and Allied trenches run in continuous parallel lines from the Swiss border to the North Sea. Bloody battles at Marne, Ypres and Champagne have exhausted both sides. Each attack on enemy trenches ends in futile bloody massacres, but no movement on the front. On 10th March the British attack at Neuve-Chapelle, but the Germans respond in April with a new weapon: poison gas. On 22nd May, during the Second Battle of Ypres, the Germans make some progress, but are driven back by the Allies in September. The price is high: 250,000 Allied soldiers and 140,000 German soldiers killed. Once again, the war is at a standstill.

GERMANS SINK THE *LUSITANIA*

1915 The British navy dominates the seas, but on 18th February Germany declares all ships around the British Isles are a target. Nearly three months later, the British luxury liner *Lusitania* is on its way from New York to Europe. On 7th May when the ship is 22 kilometres off Ireland the German submarine *U-20* fires a single torpedo. The passenger liner sinks in just 18 minutes. Of the 1,959 aboard 1,198 drown, including 128 Americans. The Germans argue that the ship is a legitimate target, as it's loaded with weapons, but the attack arouses an international outcry – nowhere more than in the United States where the mood towards Germany changes; however the country maintains its neutrality for another two years.

1916 // *The trench war remains deadlocked*

1916 // *New tactics change air war*

1916 // *The submarine Deutschland crosses the Atlantic*

1917 // *United States enters World War I*

1916-1917

BLOOD AND MUD

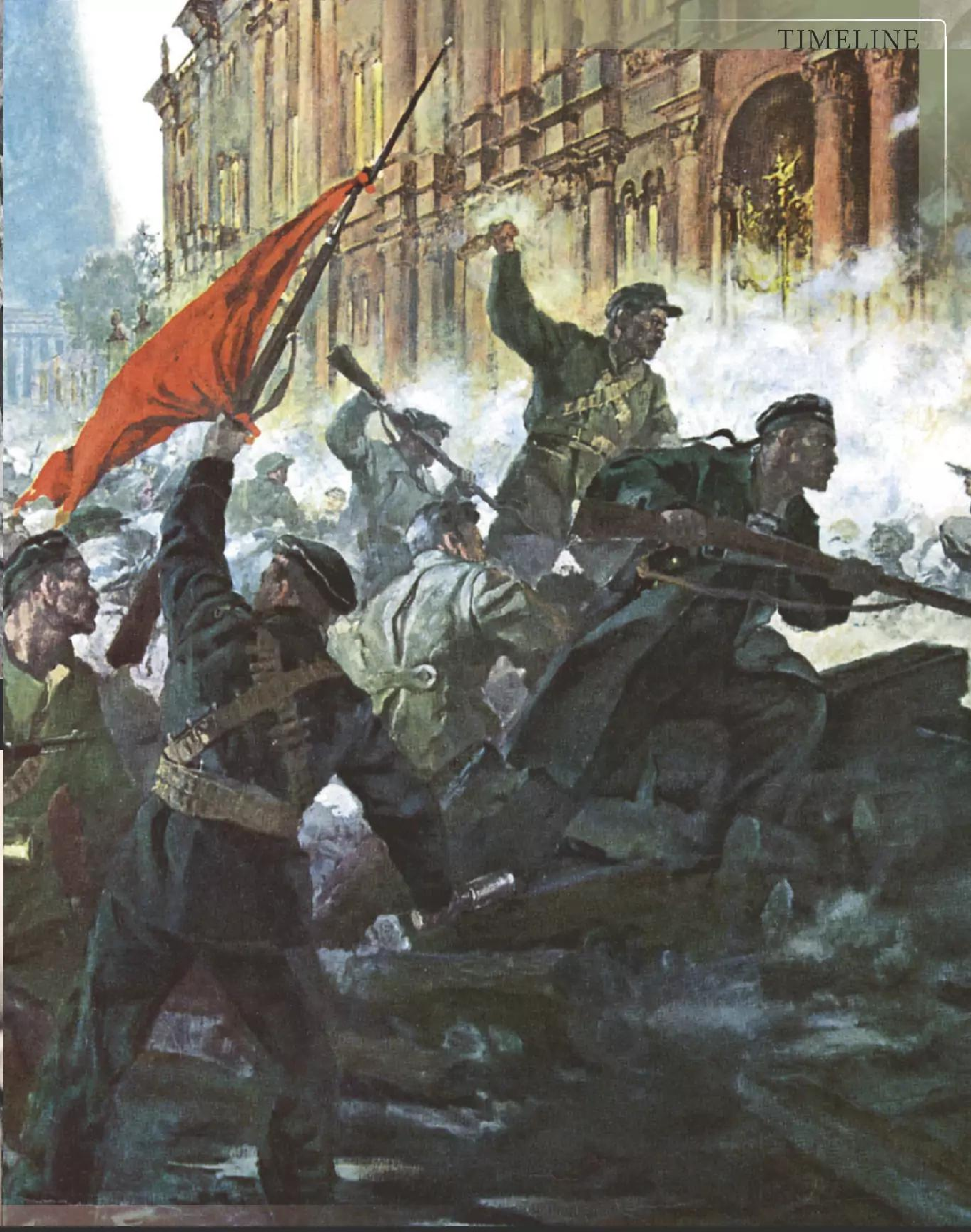
1916 On 21st February, German war minister Erich von Falkenhayn attacks Verdun in eastern France initiating the war's longest and bloodiest battle. He plans to open a wound on the front line and slowly let the French army bleed. He knows that France will never abandon the old fortified town. The plan backfires. Young German and French soldiers are killed in their thousands. When the battle ends on 15th December both sides have lost nearly half a million men, without any movement on the front lines. From July to November the same scenario plays out at the Somme leaving a no-man's land of shell craters, mud and over a million deaths.

A SLOW AND PAINFUL DEATH

1917 The futility of trench warfare fuels demand for new weapons that can break the stalemate. In April 1915 the Germans enjoy deadly success with chlorine gas developed by German chemist Fritz Haber. In 1917, Haber's chemists manufacture the dreaded mustard gas that will kill and injure 15,000 British soldiers at Ypres. It's invisible and almost odourless, so the soldiers are not aware of the attack. Hours later the damage is done, blisters develop on the skin, shortness of breath occurs, diarrhoea, internal bleeding and gas burns develop and so does blindness. Death can take up to a month to occur. In total, 1,250,000 soldiers are injured and 92,000 die.

1916 // *Chlorine and mustard gas injures millions*

1917 // *African Americans fight in two US divisions*



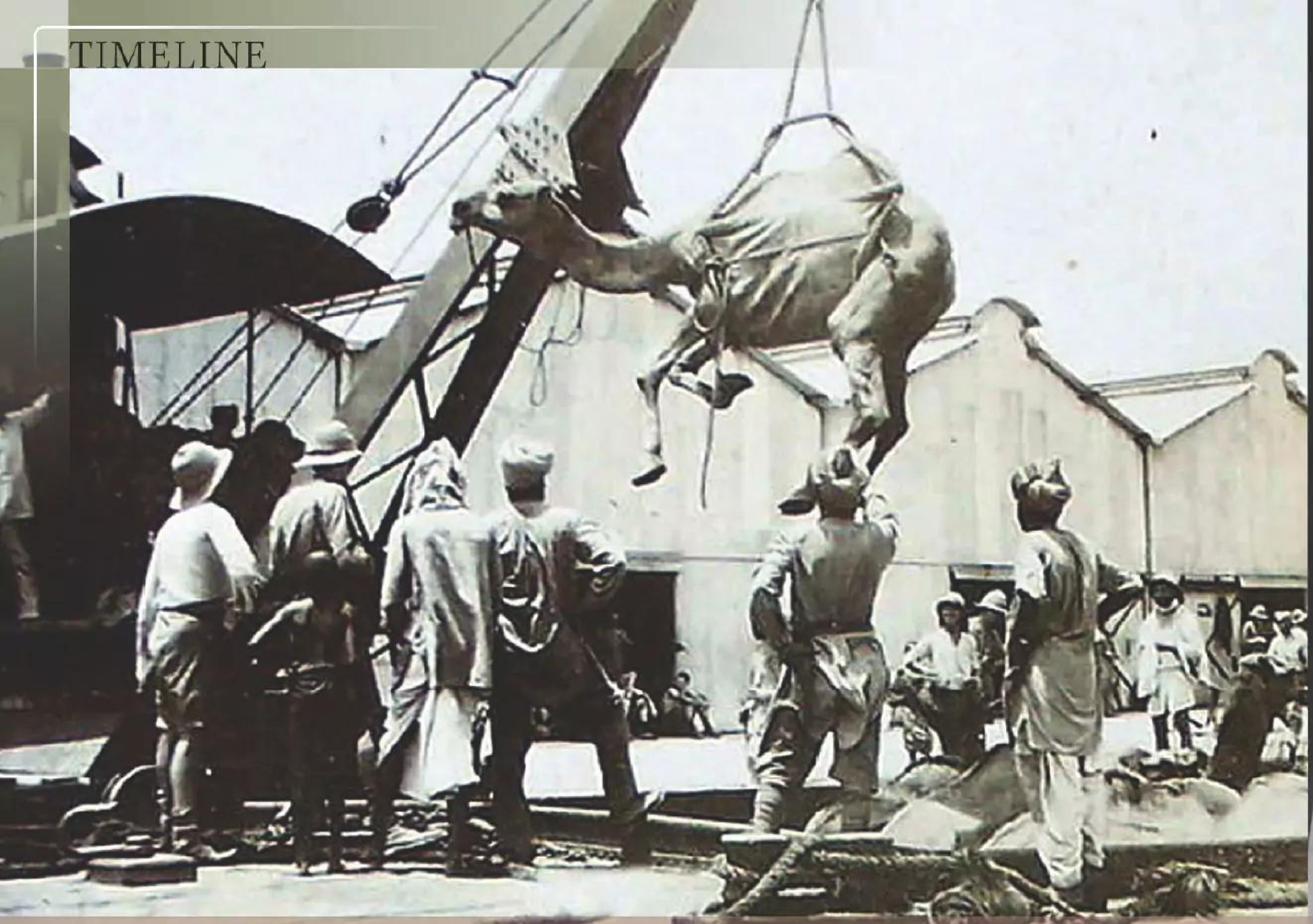
1917 // *October Revolution breaks out in Russia*

THE US ENTERS THE WAR

1917 On 1st February Germany reintroduces unrestricted submarine warfare, which it had suspended after the sinking of the *Lusitania*. Without warning, German submarines once again begin attacking Allied ships, threatening trade between the United States and the Allies. At the same time a secret telegram from Germany to Mexico falls into Allied hands: if Mexico supports Germany in the war, Germany will in turn support Mexico economically and militarily to re-take territory lost to the US. The threat is so serious that President Woodrow Wilson decides to lift America's neutrality. On 6th April the US declares war on Germany.

THE OCTOBER REVOLUTION

1917 The Russian army is falling apart. Hundreds of thousands of soldiers desert and go home. Strikes paralyse industry and millions are starving in the cities of their mother country. In February 1917 the Bolsheviks, a communist group, sit on the Petrograd Soviet (council). On 15th March the Russian Tsar Nicholas II abdicates, but the country's new government continues the war. On 24th-25th October (7th November according to the Gregorian calendar), a military coup led by Vladimir Lenin and Leon Trotsky give the Bolsheviks power in Petrograd (now St Petersburg). On 3rd March, 1918 Russia signs a peace treaty with Germany.



1918 // *158 countries participate in World War I, including African colonies*

1918 // *Lawrence of Arabia leads Arab revolt*

1918 // *Veterans*

1918 // *European civilians and soldiers are starving*

1918 // *British victory over the Germans at Amiens in France*

1918-1919

THE OVERSEAS WAR

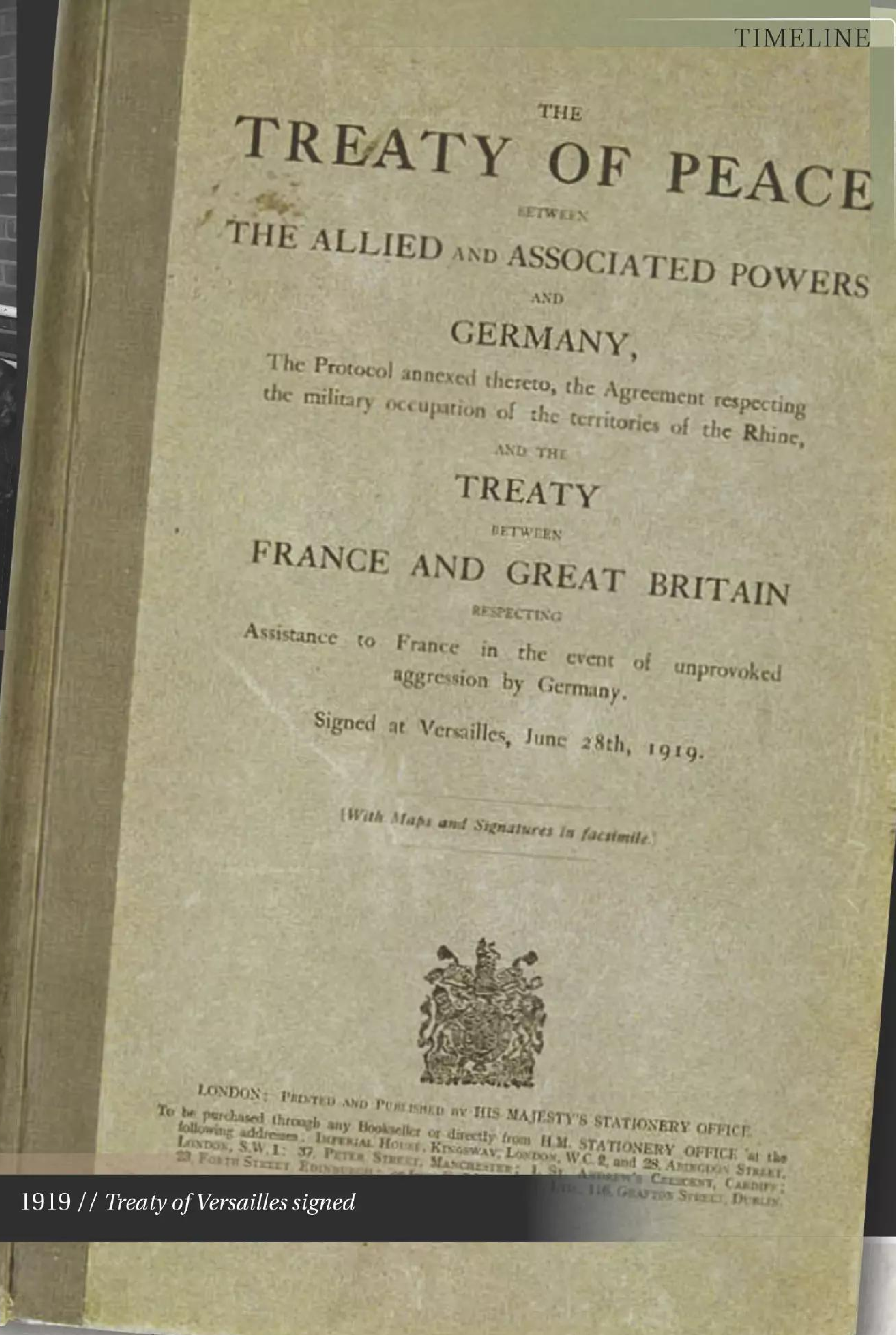
1918 War hell was not only limited to Europe. Africa, Asia, the Far East, Australia and New Zealand would also be dragged into bloody battles. In the Middle East Britain's TE Lawrence organises Arab resistance against Ottoman rule. In South America, Honduras, Guatemala, Costa Rica and Nicaragua declare war on Germany in 1918, a year after Brazil aligns itself with the Allies. In German East Africa Lieutenant Colonel Paul von Lettow-Vorbecks campaigns with just 3,000 German and 11,000 indigenous soldiers to resist approximately 300,000 British, Belgian and Portuguese troops. They are never caught and continue their guerrilla war until the end of the conflict.

GERMAN ARMY'S BLACK DAY

1918 On 21st March, Germany launches itself into the last year of the war with a major Spring Offensive against Britain and France at the Somme. General Ludendorff sends the Brits on the run, but is halted in June by US troops, who bring the Allies fresh forces and increase morale. By July, under the leadership of Marshal Ferdinand Foch, Allied forces defeat the Germans at Marne. Three weeks later, on 8th August, they take another 17 kilometres in a major offensive with 435 tanks as well as aircraft and artillery. German units flee from the battlefield, and 6,000 German soldiers are taken prisoner. Ludendorff calls it the German army's "black day".

make paper poppies to symbolise the fallen

1918 // *American euphoria over the ceasefire*



THE
TREATY OF PEACE
BETWEEN
THE ALLIED AND ASSOCIATED POWERS
AND
GERMANY,
The Protocol annexed thereto, the Agreement respecting the military occupation of the territories of the Rhine,
AND THE
TREATY
BETWEEN
FRANCE AND GREAT BRITAIN
RESPECTING
Assistance to France in the event of unprovoked aggression by Germany.
Signed at Versailles, June 28th, 1919.

(With Maps and Signatures in facsimile.)

LONDON: PRINTED AND PUBLISHED BY HIS MAJESTY'S STATIONERY OFFICE.
To be purchased through any Bookseller or directly from H.M. STATIONERY OFFICE at the following addresses: Imperial House, Kingsway, London, W.C. 2, and 28, Abingdon Street, London, S.W. 1; 37, Peter Street, Manchester; 1, St. Andrew's Crescent, Cardiff;
23, Forth Street Edinburgh;
Ltd., 116, Grafton Street, Dublin.

1919 // *Treaty of Versailles signed*

GERMANY SURRENDERS

1918 Germany is considerably weakened, and Allied Commander Marshal Ferdinand Foch and US General John Pershing launch the Argonne-Meuse Offensive on 26th September. The target is Sedan and involves a gigantic pincer movement. In October, the Allies push the Germans back from the Belgian coast and the Somme. Finally, Germany's military command must ask for a ceasefire. Germany accepts Woodrow Wilson's 14 points for peace. Kaiser Wilhelm abdicates on 9th November and flees. At 11.00 on 11th November Germany and the Allies sign an armistice that finally ends the war.

PEACE TREATY OF VERSAILLES

1919 On 28th June, exactly five years after Franz Ferdinand was assassinated, world leaders sign the Treaty of Versailles. Peace conditions for Germany are harsh: it gets the blame for the war, even though complicated alliances helped lead the world into war. Germany is required to pay war reparations of 269 billion gold marks (equivalent to 96,000 tonnes of gold). Military service is prohibited, and the country is disarmed. Finally, Germany must give up territory, including Alsace and Lorraine. But the French Marshal Ferdinand Foch considers that the Treaty to be untenable. After the signing of the treaty, he says: "This is not peace. It is an armistice for twenty years".

Ausflug nach Paris
Auf Wiedersehn auf dem Boulevard

WAR EUPHORIA IN EUROPE

1914

On 28th June, 1914 a Serbian nationalist fired a shot in Sarajevo, killing the Austrian Archduke Franz Ferdinand. Shortly after, years of simmering tensions between the great powers of Europe exploded and World War I broke out. French cheers roared, and hundreds of thousands of men volunteered for the army. But when in the autumn of 1914 soldiers dug the trenches on the Western Front, they realised that they would not – after all – return home victorious by Christmas.

1914

1914: a Serbian nationalist kills the Austro-Hungarian heir to the throne.

1914: on 28th July Austro-Hungary declares war on Serbia.

1914: the Germans attack Belgium on 4th August.

1914: 750,000 Britons allegedly volunteer for the army over a six-week period.

1914: in September soldiers on the Western Front dig down in the trenches.

1914

The group of men thrust their hands triumphantly into the air as they departed the station. They looked out of the doors and windows of their train adorned with optimistic slogans such as “Trip to Paris” and “See you on the boulevard”. The men believed they’d hit the battlefield and put the enemy out of action within a matter of weeks, or a few months.

The picture was from a German platform in the summer of 1914 and the train’s passengers rejoiced at the prospect of going to war against France. The country’s newspapers reported of war jubilation that had spread throughout the empire as “Augusterlebnis” – the German Spirit of 1914.

“The patriotic enthusiasm that has been expressed in these serious days is the most secure proof that no one will be lacking in patriotic sentiment in the difficult times we are approaching”, said the Berlin newspaper *Tägliche Rundschau* in early August 1914 when World War I broke out. Nationalism surged through the German Empire, which had been characterised by internal divisions between Bavarians and Prussians as well as religious strife between Catholics, Protestants and Jews.

Tension was brewing in Europe

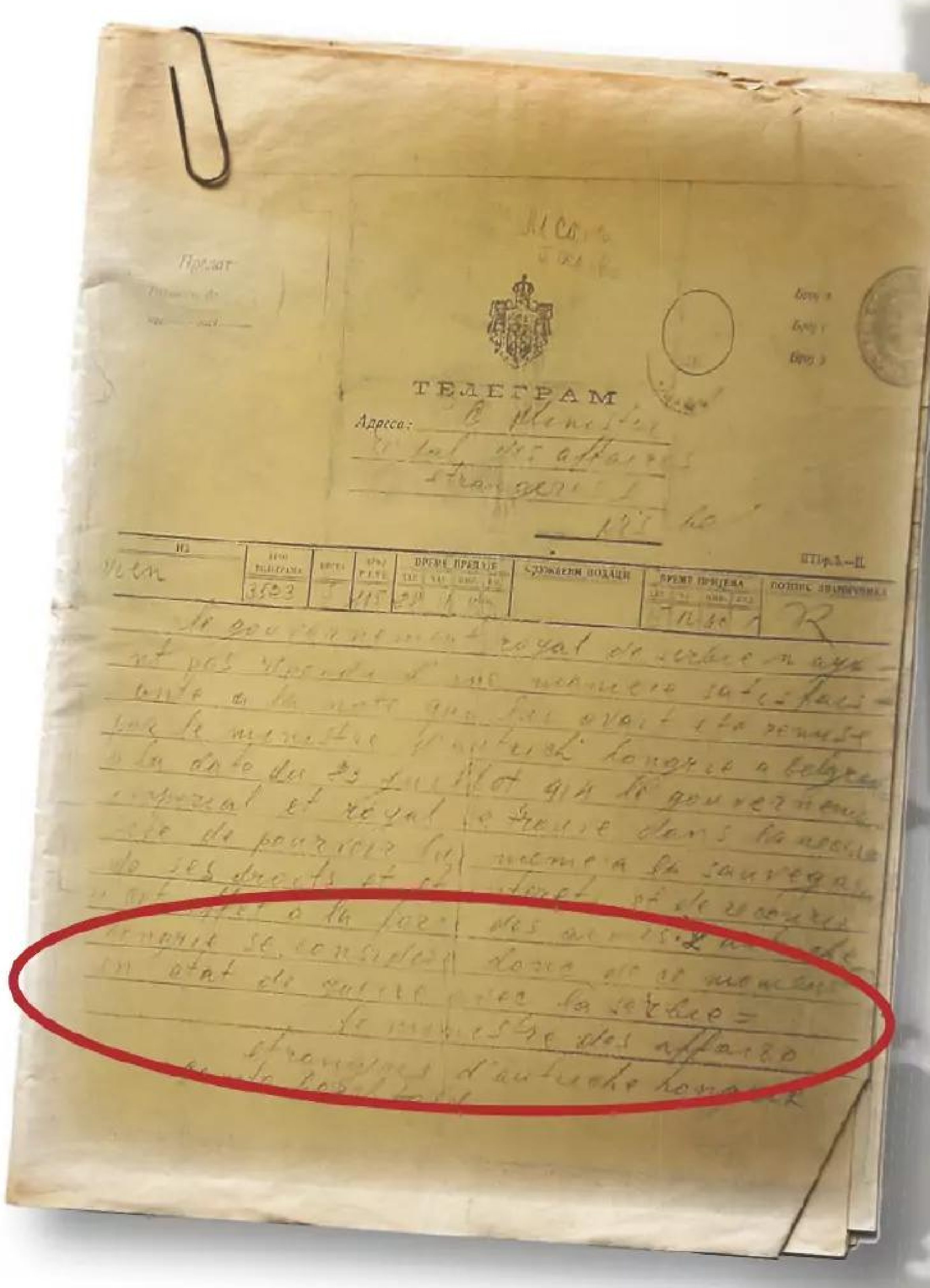
In 1914, the great powers of Europe had held peace for almost half a century. They’d not been at war since Prussia had driven the unification of Germany after victories against Austria-Hungary in 1866 and France in 1871. But German Kaiser Wilhelm II now reigned over a significant part of Europe, and that made the traditional powers of Britain, France and Russia nervous. Beneath the peaceful surface, tensions simmered. In 1892, the Franco-Russian Alliance saw France ally itself with Russia in an attempt to regain pre-eminence. Britain subsequently joined the so-called Entente Powers in 1904.

Conflicts also threatened to erupt in the Balkans. Slavic nationalists who had previously lived under the once mighty Ottoman Empire dreamed of their own nation. But Austria-Hungary had incorporated large areas, including Bosnia, and the nationalists were strongly hostile to the new supremacy in Vienna, while the growing Serbian kingdom was seen as a threat to peace in Austria-Hungary.

Gavrilo Princip, who fired the shot in Sarajevo, died of tuberculosis in prison a few months before the war ended.

Serbs shot heir to the throne

The simmering conflict exploded on 28th June, 1914 when Serb nationalist Gavrilo Princip shot and killed Franz Ferdinand, Austrian archduke and heir to the Austro-Hungarian Empire, and his wife Sophie during a visit to the Bosnian capital Sarajevo. Austria-Hungary responded to the assassination on 23rd July by handing Serbia an ultimatum with ten demands. But the Serbs would not comply with two of the points that gave Austria-Hungary’s government the right to interfere in the investigation into the murder as well as in internal affairs. So, Austria-Hungary declared war exactly one month after the shooting in Sarajevo.



On 28th July, Austria-Hungary’s government sent a telegram to Serbia. The message was a declaration of war, which ignited World War I.

With the declaration of war conflict spread like wildfire throughout Europe as Serbia allied with Russia and France. At the same time, before the declaration of war against Serbia Austria-Hungary had secured the support of the German Empire if Russia intervened in the conflict. In Germany Kaiser Wilhelm II dreamed of expanding the empire’s borders and as an ambitious expansion of the railway network in Russia was still a few years from completion, the Kaiser had an advantage in exploiting the possibility of fomenting war immediately. With the rail network completed Russia would be much stronger. Therefore, Wilhelm II swore German support for Austria-Hungary.

The Russians responded to the declaration of war against Serbia by mobilising its army to deter Austria-Hungary, and the German Kaiser declared war against Russia and France.

The German soldiers’ invasion of Belgium on 4th August gave the British a good reason to join the conflict on the side of France and Russia. The German Empire had broken the Treaty of London of 1839, which protected a neutral Belgium against invasion. So Britain now declared war.

War euphoria broke out

After the declaration of war, Theodor Wolff, editor of the newspaper *Berliner Tageblatt*, described the empire’s mood:

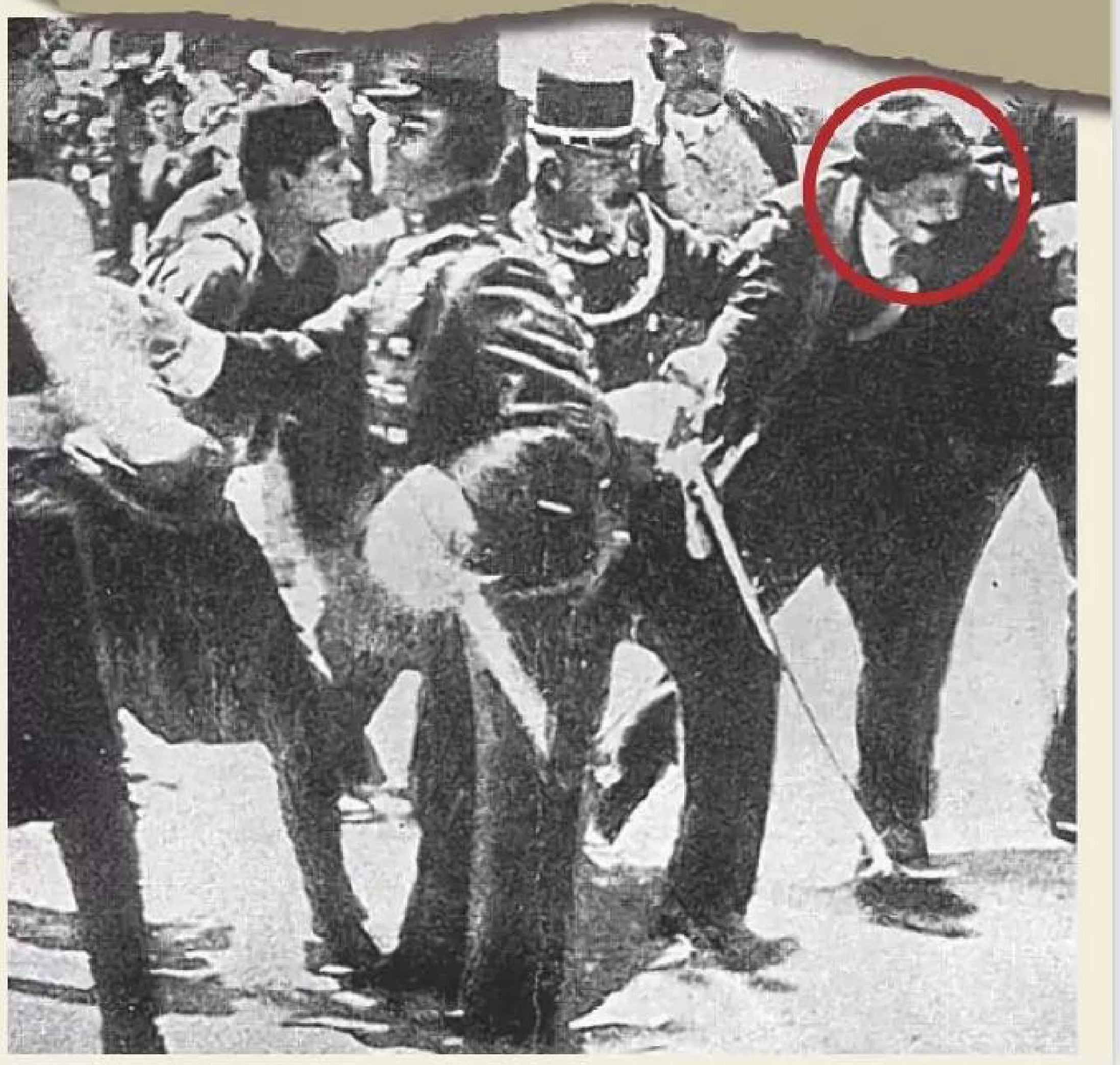
“The hurrah-yelling crowd heated itself up to a stormy enthusiasm... as if the crowd wanted to show the Kaiser through their proximity, how close they felt to him”.

Students in towns cheered and sang patriotic songs about the superior German

KEY MOMENTS

SHOT IN SARAJEVO

On 28th June, 1914, when Austrian archduke and heir to the throne Franz Ferdinand and his wife Sophie visited Sarajevo, a member of the nationalist group Black Hand Gavrilo Princip lay in wait. He would kill the heir to the throne in the struggle to integrate Bosnia and Serbia. When the royal carriage passed the Latin Bridge, Princip fired the shot that killed his victim. The assassination triggered World War I.



With the belief that soldiers would return home before Christmas, German women enthusiastically followed their men to the platforms in August 1914.

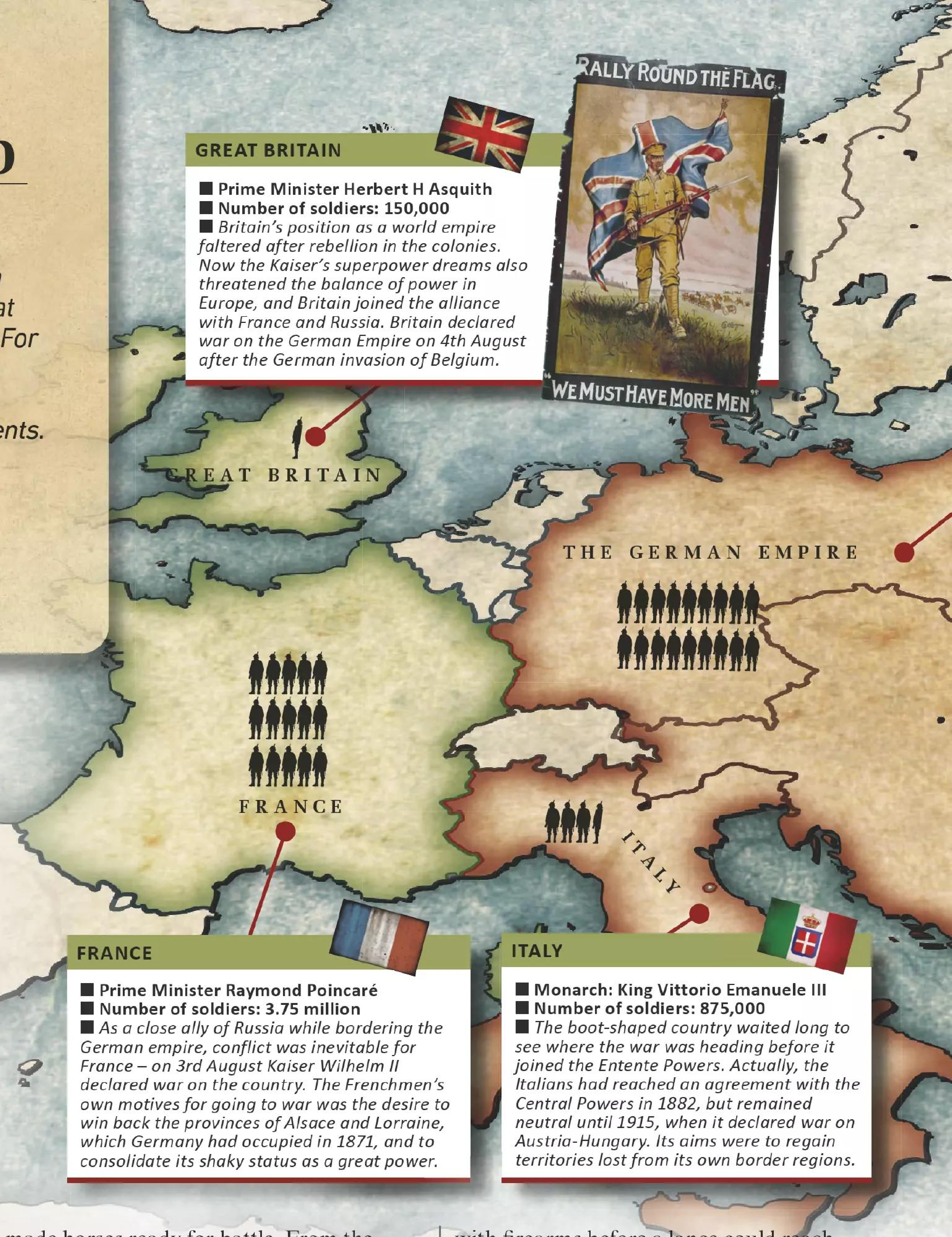
CONFLICT TURNED INTO WORLD WAR

When Austria-Hungary declared war on Serbia on 28th July, 1914, Europe's great powers were already prepared for war. For years they had rearmed and entered military alliances. Alliances caused the Balkan conflict to spread across continents.

🟩 *Entente Powers*

🟧 *Central Powers*

Number of soldiers at the outbreak of war. Each soldier represents 250,000 men.



GREAT BRITAIN

- **Prime Minister Herbert H Asquith**
- **Number of soldiers: 150,000**
- *Britain's position as a world empire faltered after rebellion in the colonies. Now the Kaiser's superpower dreams also threatened the balance of power in Europe, and Britain joined the alliance with France and Russia. Britain declared war on the German Empire on 4th August after the German invasion of Belgium.*

FRANCE

- **Prime Minister Raymond Poincaré**
- **Number of soldiers: 3.75 million**
- *As a close ally of Russia while bordering the German empire, conflict was inevitable for France – on 3rd August Kaiser Wilhelm II declared war on the country. The Frenchmen's own motives for going to war was the desire to win back the provinces of Alsace and Lorraine, which Germany had occupied in 1871, and to consolidate its shaky status as a great power.*

ITALY

- **Monarch: King Vittorio Emanuele III**
- **Number of soldiers: 875,000**
- *The boot-shaped country waited long to see where the war was heading before it joined the Entente Powers. Actually, the Italians had reached an agreement with the Central Powers in 1882, but remained neutral until 1915, when it declared war on Austria-Hungary. Its aims were to regain territories lost from its own border regions.*

people. Military parades celebrated male virtue, and euphoric youngsters were convinced that Germany would win a heroic victory. When the summer holiday was over, very few young men went back to school at Berlin's universities – they had instead signed up as soldiers. 35,000 students took on the grey uniform. None of the warrior youths could foresee the massacre that would ravage Europe over the next four years.

PEASANTS' HORSES TOOK PART

There was less enthusiasm for the war among German workers and the rural population,. The workers feared their jobs would not exist after the war. In the countryside the peasants had not yet taken in the harvest, and work stopped when army representatives arrived at the farms and took the workhorses away. To prepare for war, the German army both bred horses on state-funded farms and paid farmers to always have healthy animals ready for the cavalry and to transport army supplies to the front. In the war's first week they mobilised more than 700,000 horses in the German Empire. The French, Russian, Ottoman, Serbian and British armies also made horses ready for battle. From the outset of war, it quickly became clear that the cavalry, like the German Ulan regiment equipped with lances, was obsolete when the enemy could now shoot horse and rider with firearms before a lance could reach the enemy.

In south-western Germany near the border with France, the population had not yet forgotten the 1870-71 war with their neighbours, when Germany had occupied the French provinces of Alsace and Lorraine, as the countries fought. Fears of a looming French invasion and subsequent reprisals prompted several German women in Alsace to take their own life, as the men went to war.

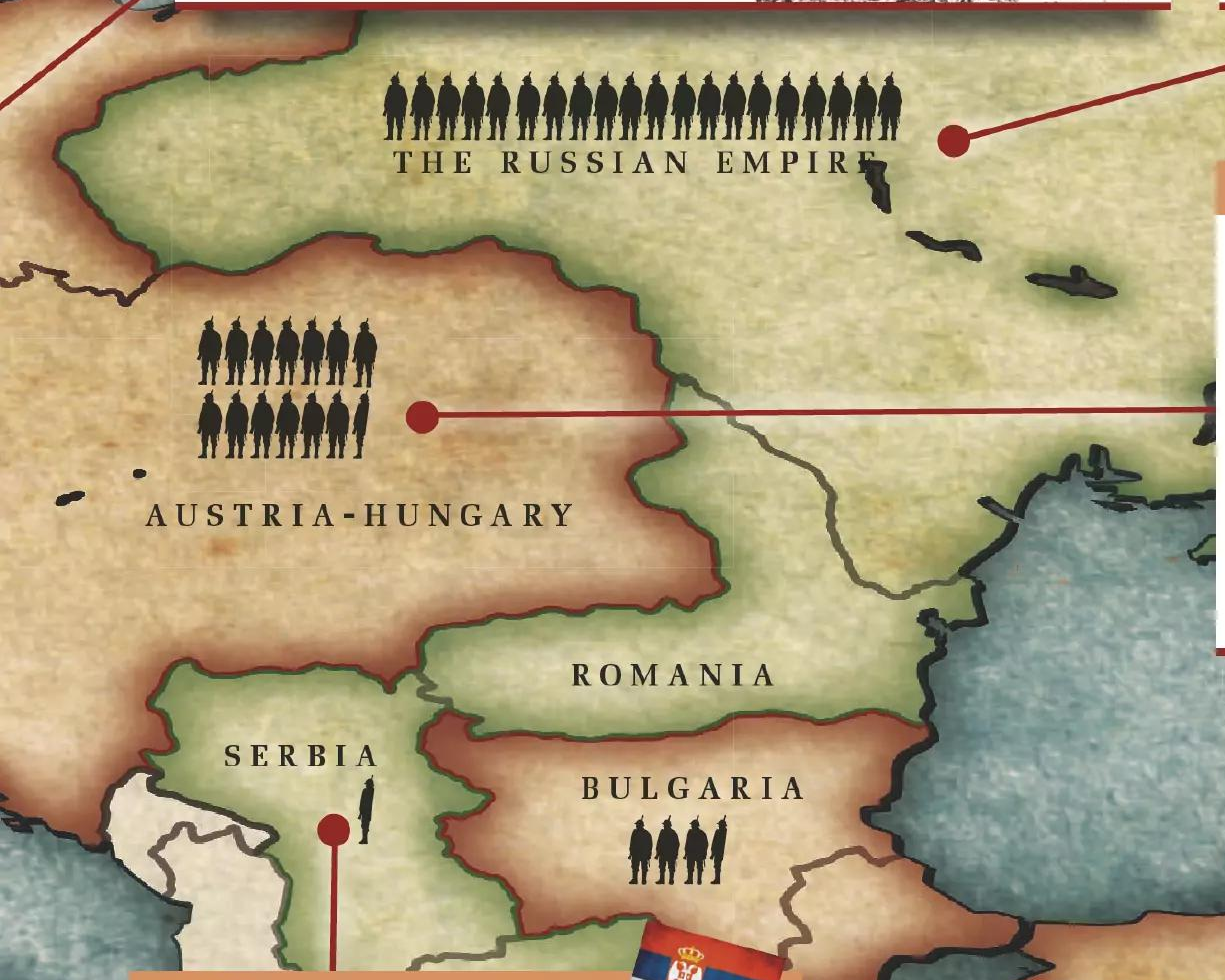
"Everywhere there are groups of men who speak of war. Crying women sometimes mix in these groups. At the same time a couple of 15 to 17 years olds march, more yelling than singing, through the streets", reported a German writer from Alsace.

WAR WAS EXPECTED TO BE QUICK

The blend of spirited frivolity and fear of war also spread across the Entente

DE 120 LONG N°291

The French army showed up in colourful parade uniforms. Dressed in red and blue made them easy targets so the uniforms were replaced in 1915.



THE GERMAN EMPIRE

- **Monarch: Kaiser Wilhelm II**
- **Number of soldiers: 4.5 million**
- *Before the war Wilhelm II had plans for a bigger and stronger German Empire. He ordered the build-up of the fleet and army and developed a network of railways across the empire. Austria-Hungary's plea for the Kaiser's support after the shooting in Sarajevo was a timely invitation to go to war and expand Germany's boundaries.*

THE RUSSIAN EMPIRE

- **Monarch: Tsar Nicholas II**
- **Number of soldiers: 5 million**
- *Before the war Russia and Austria-Hungary fought for power in the Balkans. The Tsar was under great internal pressure to help Serbia. With an economy hanging in tatters, Russia was building up to threaten Austria-Hungary. The result was that the German Empire declared war on Russia on 1st August, 1914.*

Вадящій пулеметъ на позиціи.

AUSTRIA-HUNGARY

- **Emperor of Austria and King of Hungary: Francis Joseph I**
- **Number of soldiers 3.4 million**
- *In contrast to its neighbours, Austria-Hungary had not rearmed since its defeat to Prussia in 1866 and was therefore militarily weak. At the declaration of war against Serbia, Austria-Hungary needed the Kaiser's support to keep the Russians back, so the Austro-Hungarian soldiers could fight the nationalists in the Balkans and secure the empire's territories.*

SERBIA

- **Monarch: King Peter I**
- **Number of soldiers 180,000**
- *In the wake of the Ottoman Empire's decline the dream of a Greater Serbia prevailed, which would include Bosnia, where a large Serbian minority resided. After the shooting in Sarajevo and Serbia's rejection of Austria-Hungary's ultimatum, Austria-Hungary declared war on Serbia.*

THE OTTOMAN EMPIRE

- **Monarch: Sultan Mehmed V**
- **Number of soldiers: 625,000**
- *Following military defeats and internal independence struggles the Sultan was under severe pressure. The Russian Tsar had dubbed the Ottoman Empire the "sick man of Europe" at the outbreak of war. The Sultan allied himself with the Central Powers in 1914 in the hope of recapturing lost territory in the Balkans.*

Powers in France, Britain and Russia. The new European idea of states with strong central power, military service and growing nationalism brought people together within national borders. The sense of duty to defend the homeland had seized Europeans.

Evolving industrialisation and technological advances in weaponry, communications and conscription enabled the armies to convene, organise and equip an unprecedented number of soldiers. The German Empire, Austria-Hungary, France and Russia no longer had just hundreds of thousands of soldiers, but millions of men. Bigger and better equipped forces built up the confidence of both military alliances. Enthusiastic soldiers figured they were going on a short mission that would quickly break the enemy, bring them victory and allow them return home before Christmas.

The idea of a quick war was so widespread that the Hungarian brewery Kőbánya utilised war sentiment in its advertising campaign. The brewery's advertising poster in 1914 pictured two soldiers who toasted a well-poured beer in front of a cannon and a beer keg. Behind them lay great hordes of enemy soldiers in various countries' uniforms with their hands over their heads, while the advertising slogan on the poster read: "Beer from the Spring Hops has Arrived – The Enemy is Surrendering".

MOBILISATION RAN SMOOTHLY

Generals on both sides had miscalculated, however, because war strategies had been overtaken by the rapid development of technology. All future military and politicians believed in a quick war of aggression. But the development of heavy artillery and machine guns, as well as much larger armies with millions of men strengthened defences. At the same time, well-developed rail networks both in France, Germany and Austria-Hungary made it easy for armies to move reserves from frontier to frontier to maintain their defensive lines.

In the years leading up to the war, German workers in particular had been busy laying railway tracks across the new empire. Now its six main lines could be used to transport troops and supplies. From 1909 to the outbreak of war at the borders with Belgium and Luxembourg, the Germans had built platforms that could accommodate far more people than the passengers in the villages they had to operate from. Larger platforms and more powerful locomotives enabled the Germans to mobilise nearly 12,000 soldiers in one day – that is, four times as many as in 1870-71 during the war against France. The first weeks of mobilisation were determined by the railway's capacity

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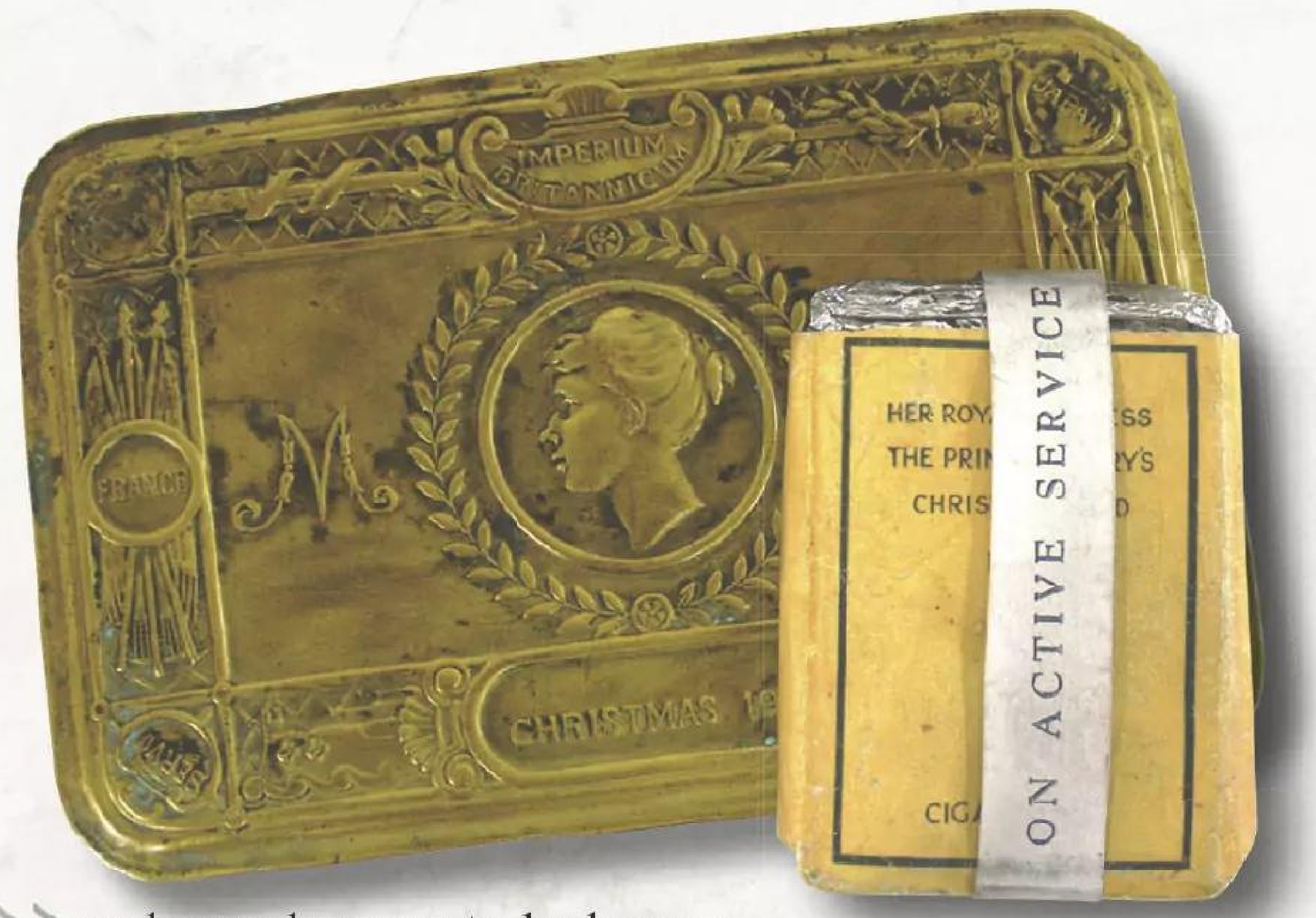


Britain's Princess Mary gave a gift box that included cigarettes and a lighter to all who volunteered for the army in 1914.

>>>> and were became to be known as the "railway war".

On the platforms women and children said farewell to the enthusiastic soldiers, waving goodbye to the packed trucks with their white handkerchiefs, while marching bands played to honour the soldiers.

Not all Germans were excited about the idea of war.

"The sun sinks to the horizon. Soon I shall be tossed into a gentle mass grave. In the sky the fine red of evening is burning. Perhaps in thirteen days I'll be dead", wrote 25-year-old German poet Alfred Lichtenstein at his farewell before travelling to the front. He died on 25th September, 1914.

It was clear from early on that the number of fallen soldiers would be much higher than expected. But generals just drafted in more soldiers. In addition to the conscripts, a reported 300,000 German men volunteered for the army in the first tranche. Some of them underwent only eight weeks of training before they bounced along in wagons to the Front.

Men lined up to go to war

Britain had not introduced conscription, and as most of the country's troops were stationed in the colonies, Britain had no more than 150,000 troops at the war's start. But within the first six weeks of the war, 750,000 eager Britons enlisted to "maintain the honour and glory of the British Empire", as quoted on the recruitment posters.

13 million
Soldiers mobilised for the German armies during World War I.

Encouraged by Admiral Charles Fitzgerald, a movement of British women began handing out white feathers to men who hadn't volunteered for the army in August. The feather symbolised that the man was a coward, which persuaded even more Britons to the recruitment offices: more than the army could train and equip. The men were placed in temporary camps wearing improvised uniforms because of a shortage of khaki fabric and armed with items like brooms.

Eagerness to head to the Front simmered among the new British recruits.

"If I ever get sent to the Front with a Regiment, I shall almost shed tears of joy… I do envy Chris [author's brother] going off so soon, but I think this dog [author himself] is going to have his day soon too", wrote Captain Noel Chavasse on 18th August, 1914 in a letter to his family. The result of sending unprepared men to war was seen at the French town of Loos on 26th September, where 8,000 out of 10,000 newly-arrived British soldiers lost their lives on their first day at the Front. By the time the British introduced conscription in 1916, a total of 2.6 million men had already volunteered for the army.

Germany occupied Belgium

Germany's war strategy – the "Schlieffen Plan" was prepared between 1891 and 1906 by General Field Marshal Alfred von Schlieffen. The plan was that the Germans would quickly put France out of action through a surprise attack through Belgium before re-routing forces to the Eastern Front and the fight against Russia.

When fighting broke out on 4th August Belgium did not surrender to the Germans, and the invasion was the first indication

In September, 1914, 6,000 French soldiers were transported to the Front by Paris's taxi drivers. The tactic helped stop the German advance.

that the warlords had miscalculated. Instead of a few days, German soldiers ended up fighting for 11 days to take control of Belgium and force the country's government into exile. At the same time, parts of the rail network were destroyed, so German troops had to march at a speed of 25 kilometres a day instead of the planned 30 km/h provided by the railways.

Germany's attack on Belgium echoed in the world press:

"Whole villages, they said, had been put to fire and sword. One man whom I did not see told an official of the Catholic Society that he had seen with his own eyes Germans chop off the arms of a baby which clung to its mother's skirt", said one witness in *The Times* on 27th August. During the invasion German soldiers killed more than 6,000 people and used civilians as human shields.

THE RISE OF JOB WARFARE

Despite the delay, the capture of Brussels on 20th August and subsequent victory in Belgium made the country feel like nothing more than a bump on the road to France, and the optimistic "Schlieffen plan" seemed like it would succeed. French generals had relied blindly on the neutrality of Belgium being respected, and within three weeks German troops stood frighteningly close to Paris. The richest Frenchmen travelled out of the capital, and the government moved to Bordeaux.

But the fortunes of war would soon turn away from the Germans' favour. When Wilhelm II's soldiers crossed the river Marne, French generals recognised that they were in the wrong location at the Franco-German border defending against the Germans, and quickly changed strategy. On 7th September, French general Joseph Gallieni decided to convene all Paris taxis and hire them to transport 6,000 soldiers to the Front further north, enabling the French to halt the German advance.

HOPE FOR A SWIFT CONCLUSION DIED

The two armies both fought to advance and encircle the enemy, and soon the front ran right from the Swiss border to the Belgian North Sea coast. The Germans were still on French soil as they dug into the trenches, and all hope of a quick victory before Christmas was extinguished.

Lieutenant Neville Woodroffe described the new reality in a letter to his mother before he died on 16th November, 1914: "Really this war is terrible... I wonder when it will end; one hears so much. There has been more fighting and more loss of life crowded into seven weeks than there was in the whole of South Africa [1899-1902]."

A month later a visionary regular British soldier wrote to his family:

"The war is going to last a long time, maybe 12 months... It will be a long war of attrition, and it has only just begun".

With 250,000 dead and wounded soldiers on both sides of the front during the first battle of the Marne and up to a million Frenchmen wounded and killed over three months, soldiers realised that reality at the front was quite remote from the euphoria of war they'd experienced a few months earlier. Life on the Western Front had proved to be no "Trip to Paris". ■

TECHNOLOGY CULTURE ECONOMY EVERYDAY

Machine gun defended trenches

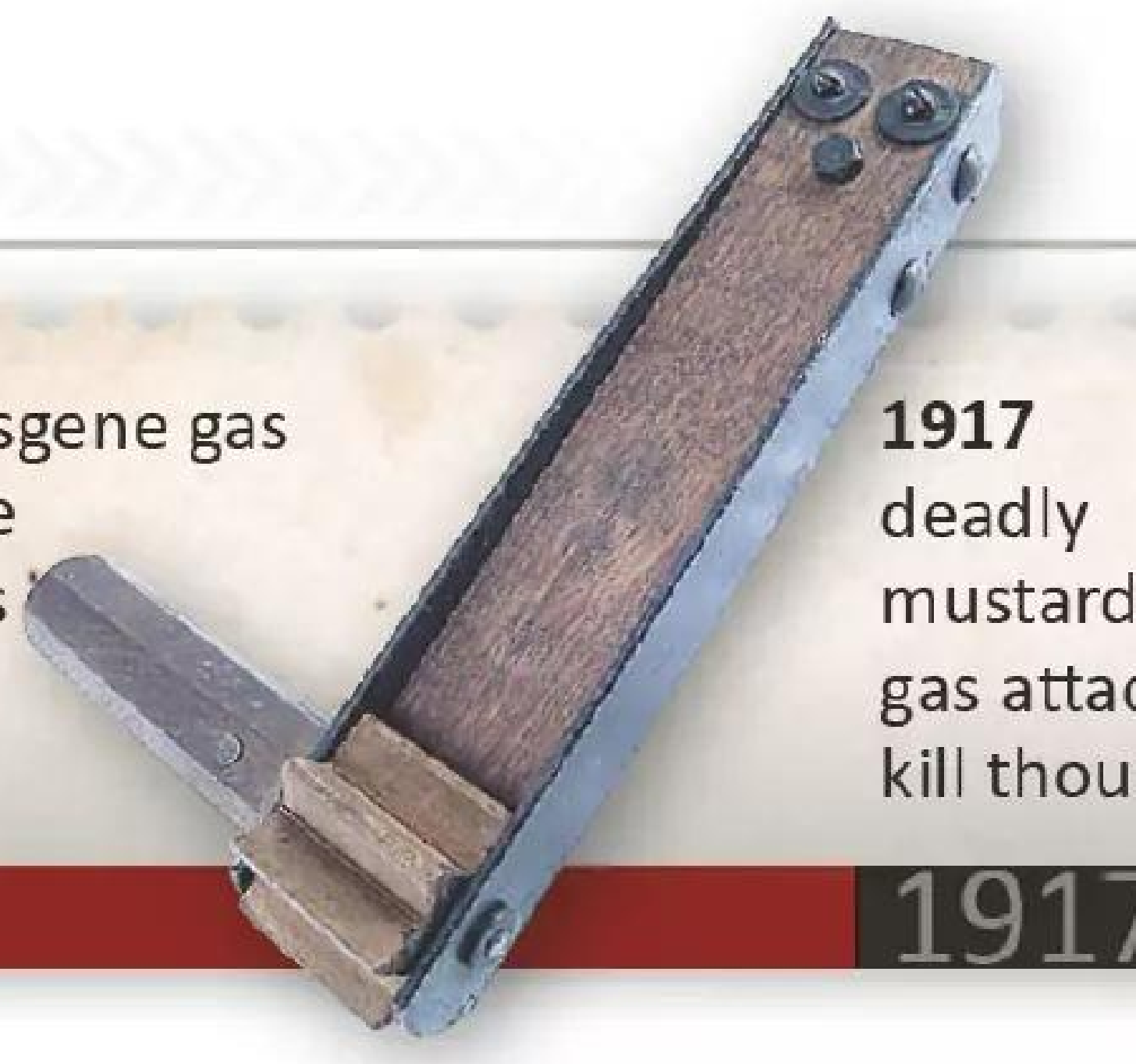
In 1882 American inventor Hiram Maxim developed and patented the first gun that utilised the energy from recoil to load and fire the next shot: the machine gun. During World War I the German Empire equipped its soldiers with 12,000 machine guns. Since each weapon weighed 25 kilograms and required several men to operate, it was not suitable for mobile attacks, but it was well-suited to defending the trenches.

GAS WAR

1915-1918

In the spring of 1915 German soldiers sent a puff of toxic chlorine gas out over enemy trenches for the first time. The French soldiers on the other side of the front sensed the first sweetish odours before being seized by coughing, and panic spread. Some fled, others fell gasping. The chlorine gas attack started a race among European chemists to develop the most effective poisonous gas for chemical warfare. While poisoned soldiers writhed in pain on the battlefield, German chemist Fritz Haber worked away in his laboratory – until he had invented the perfect killer.

1915-18



1915 German soldiers attack the French army with chlorine gas at the city of Ypres.

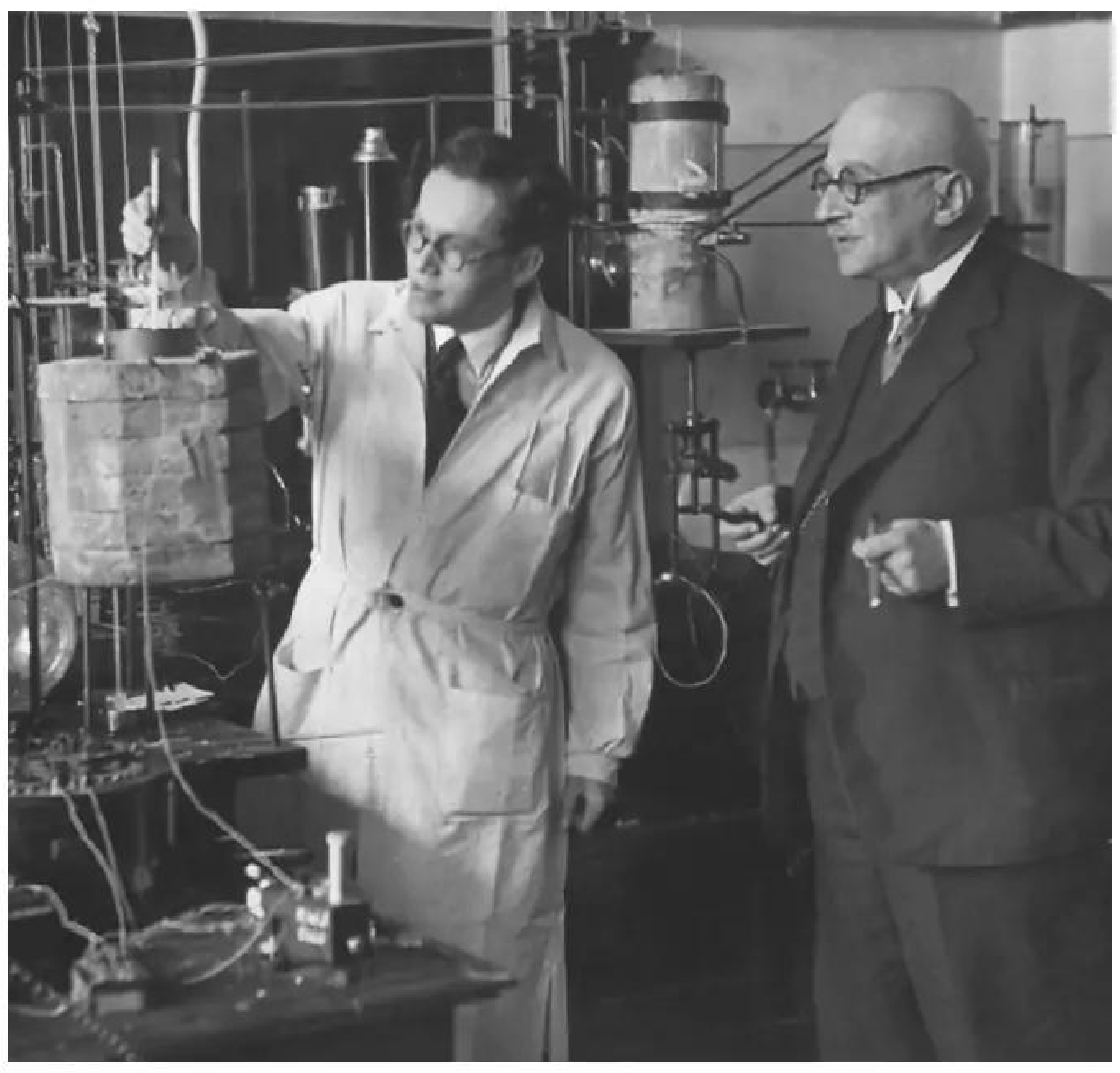
1915 chemist Fritz Haber's wife commits suicide after gas attacks.

1915 phosgene gas cheats the British gas warning system.

1917 deadly mustard gas attacks kill thousands.

1915

1917



The man behind the poison gases, Fritz Haber, won the Nobel Prize in chemistry immediately after WWI for inventing chemical fertilizers.

On 22nd April, 1915 French soldiers in the trenches at the Belgian town of Ypres suddenly saw a strange greenish-yellow fog spreading from the other side of the front. The smoke cloud rose directly in front of them, and soon they sensed a sweetish odour – like a mixture of pepper and pineapple – irritating their nostrils. The officers gave immediate orders to be on guard as the cloud could very well hide German forces.

But the smoke cloud not only served as camouflage. It consisted of 180,000 kilograms of chlorine gas, which in just five minutes had been released from 5,730 cylinders located along seven kilometres of the front and wafted towards the French on the wind. Shortly after, panic spread in the trenches when the German infantry appeared behind the fog wearing coarse masks that made them look like nightmarish creatures.

Hundreds of soldiers collapsed as the poisonous chlorine gas penetrated their bodies and burned their lungs. The bodies fell, stiff and blue, with faces distorted in agony while those that were still alive fled the trenches. But the gas cloud was in hot pursuit, and many fell as they ran.

"Hundreds of them fell and died; others lay helpless, froth upon their agonised lips and their racked bodies powerfully sick, with tearing nausea at short intervals. They too would die later – a slow and lingering death of agony unspeakable", recalled Captain Hugh Pollard.

The Hague Convention of 1899 had banned the use of poison gas in war. But German generals defended the attack on the basis they'd unleashed chlorine gas from cylinders on the ground and not through firing projectiles, as the wording of the Convention stated.

The British Army called poison gas an "accessory" as gas attacks were outlawed by the Hague Convention of 1899.

Pleased with poison gas

Renowned German chemist Fritz Haber had invented the chlorine gas poison, and was on the battlefield at Ypres. He was excited after the first attack and concluded:

"In no future war will the military be able to ignore poison gas. It is a higher form of killing".

Haber, who was born in Germany in 1868, was of Jewish descent, but as a young man had converted to Christianity to be accepted in the German Empire. From his youth he was a patriot who wanted to serve his country.

Before World War I Haber had emerged as an outstanding chemist – in 1909 he found out that nitrogen and hydrogen could convert to ammonia and thus produce enormous amounts of cheap fertilizer. The invention is considered by many scientists as one of the most important in the 20th century because it made it possible to support a larger population through agriculture.

These impressive achievements saw the highly acclaimed chemist appointed as head of the Kaiser Wilhelm Institute for Physical Chemistry and Electrochemistry in Berlin in 1911, and at the outbreak of war in 1914 he saw the chance to finally be accepted by German society despite his Jewish background.

Haber poured all his research efforts into equipping his country to win the war, and when the German army asked him to examine the possibility of replacing the explosive in grenades for gas at the beginning of the war, Haber accepted willingly. He enjoyed early support from fellow nationalist Carl Duisberg, who was leader of the world's leading chemical cartel IG Farben. After the outbreak of hostilities, the powerful businessman had tried to develop poison gas, and early in the war had urged the army's high command to introduce chemical warfare. With Duisberg

EYEWITNESS

*ARTHUR GUY EMPEY / **Western Front, 1916***

SANDBAGS SEEMED TO FLOAT

"A company man on our right was too slow in getting on his helmet; he sank to the ground, clutching at his throat, and after a few spasmodic twistings, went West (died). It was horrible to see him die, but we were powerless to help him... Then my head began to swim, throat got dry, and a heavy pressure on the lungs... The trench started to wind like a snake, and sandbags appeared to be floating in the air. The noise was horrible; I sank onto the fire step, needles seemed to be pricking my flesh, then blackness."

Chlorine gas and mustard gas blinded victims who had to be moved from the battlefield in rows, each soldier holding onto his mate's shoulder.

backing him, Haber had full financial support, and in the autumn of 1914, they collaborated to develop the perfect poisonous gas.

Top physicists made chlorine gas
Haber assembled a team of the day's foremost scientists, including physicist Hans Geiger, who later invented the Geiger counter. The team worked around the clock to test chemicals, and some of those attempts ended in accidents, one of which resulted in a chemical explosion that cost one of Haber's employees his life.

In January 1915 a proud Fritz Haber unveiled his new chemical weapon to the German General Staff. The result of months of persistent trials was a gas from a substance that Germany had huge stocks of – chlorine. Until the war, the German chemical industry exported large amounts of chlorine, but with the outbreak of war business stagnated and orders cancelled.

Haber's idea was to transport liquid chlorine to the front in high-pressure steel cylinders. The cylinders would be lined up in rows, one metre apart in the front trenches, and at any given time, when the wind blew against the enemy lines, the soldiers would open the valves on all the steel cylinders. The liquid bleach would immediately be converted to a toxic gas cloud that – thanks to the gas's gravity – would move along the ground towards the enemy and all the way into their trenches.

Haber had calculated that a concentration as low as 1:1,000 of gas in the air would prove fatal.

In the enemy's trenches the chlorine gas would dissolve in the moisture from the soldiers' skin or eyes and mucous membranes of the nose, throat and lungs. This naturally created hypochlorous acid (HOCL) would be converted to the extremely toxic and highly corrosive hydrochloric acid, which would destroy both airways and organs, with many soldiers dying sooner or later. Even survivors would be invalided for a long time – if not permanently.

Haber's wife committed suicide
The General Staff's expectations were sky high when chlorine gas from 6,000 cylinders was tested on the battlefield of Ypres, and

> “The bodies fell, stiff and blue, with their face distorted in agony”

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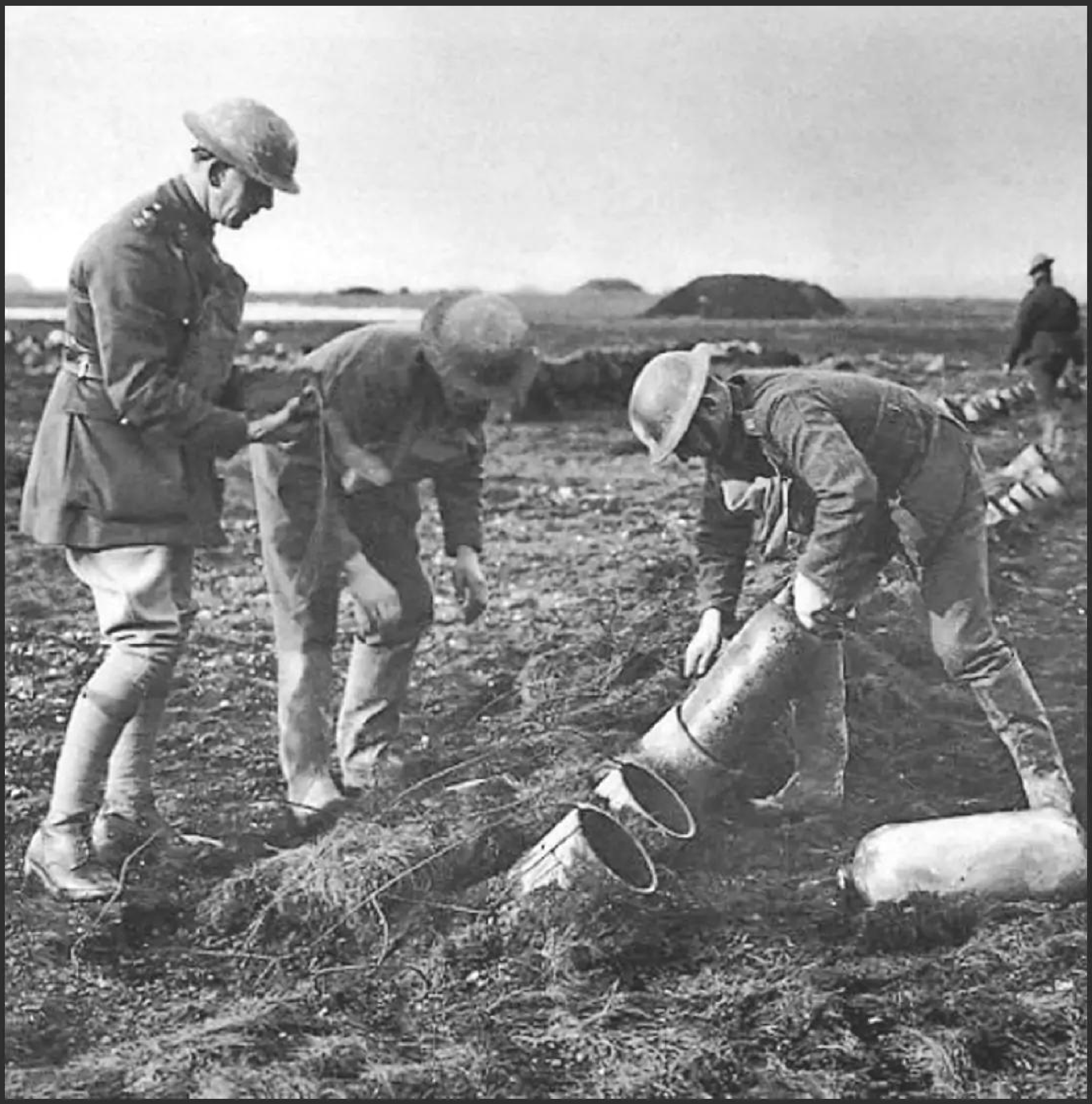
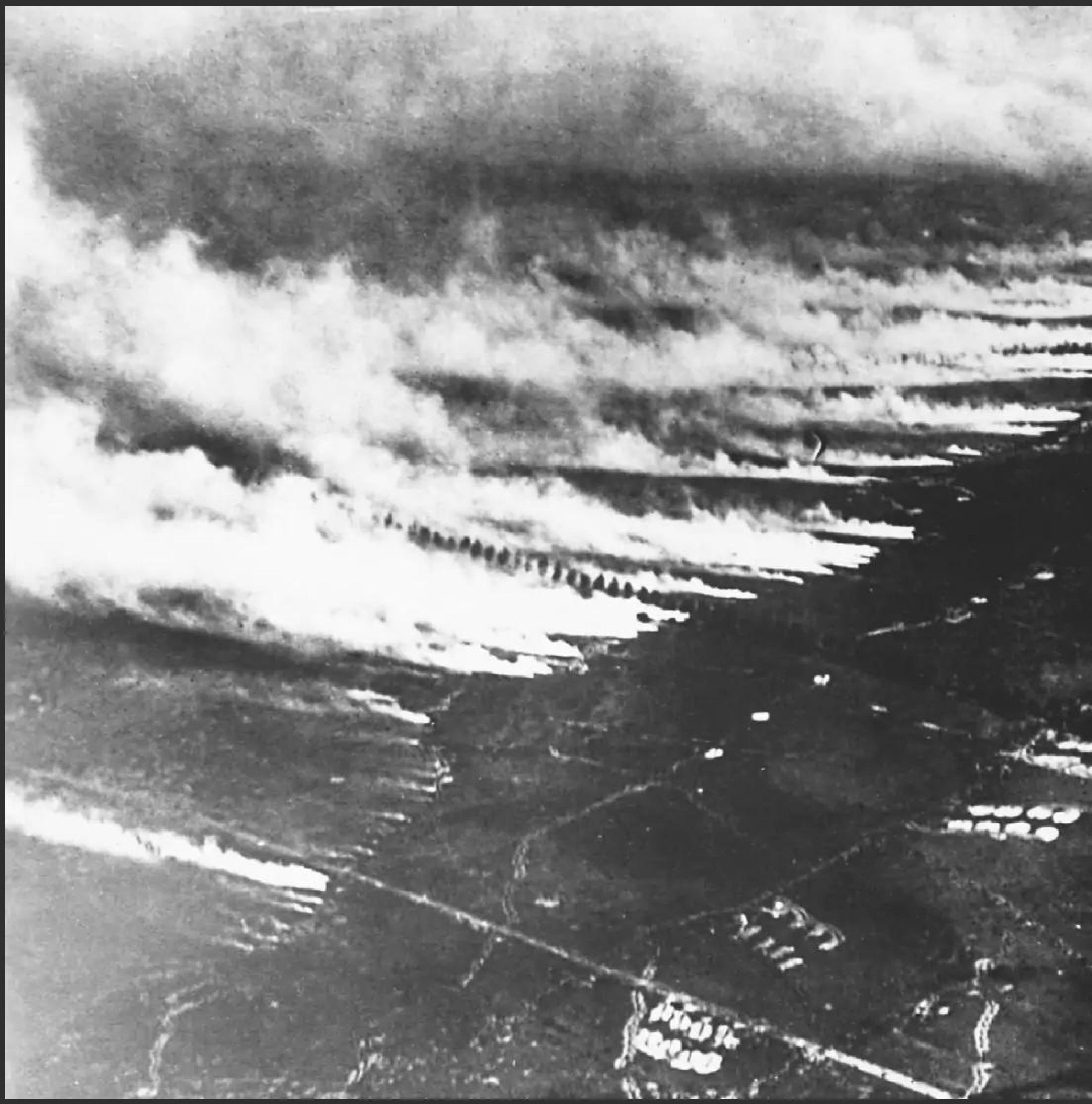


FIRING: the armies fired gas cylinders and let the wind carry the gas towards the enemy. If the wind turned, the poison could change direction hitting them instead.



ATTACKS: poison gases were heavier than air so they snaked over the ground and into the trenches that could be rendered unusable for weeks.

>>>> neither the German generals nor Haber were disappointed.

German newspapers filled their editorial with stories of the chlorine gas's great success. But at Haber's home in Berlin the chemist's wife, Clara Immerwahr was crying when she read the stories of the poison gas. She was a chemist, the first German woman with a doctorate in the field and was frustrated by the disturbing turn her husband's research had taken.

When Haber came home from the front ten days after the gas attack at Ypres, he was honoured by Kaiser Wilhelm II, and he celebrated the success by inviting his colleagues to a party. The distraught Clara was not in a party mood. Early in the morning on 2nd May, when all the guests had left their home, she grabbed her husband's service revolver, slipped out into the garden and turned the gun on herself. She fired the gun twice against her chest and fell. Shortly after, the couple's young son found her dead. Haber then left for the Eastern Front to plan the next tranche of gas attacks.

WIND TURNED THE GAS

On the Eastern Front Haber organised three gas attacks that sent 25,000 Russian soldiers to their death and wiped out whole regiments. Throughout the war, up to half a million of their Russian comrades were also victims of poison gas attacks. During World War I the Russian Army never mastered chemical warfare. But on the other side of Europe, on the Western Front, the Allies were almost ready to counterattack.

Initially the British had condemned the German gas attacks. Yet, at the same time the British Army was planning how it could use gas attack on the Germans.

> "The gas did not just kill enemy soldiers, but also wiped out all animal life. Even birds... fell to the ground dead"

At dawn on 25th September, 1915 at the town of Loos in northern France, the British released 400 containers of chlorine gas allowing the infantry to follow the cloud of smoke. The attack largely followed the same procedure Haber had developed. But British soldiers did not have the weather with them. While they marched behind the gas cloud, the wind changed direction and large quantities of gas blew right back into the British trenches. Historians do not know the exact death toll that morning, but estimates suggest the poison gas killed more British soldiers than German. Although the wind saved some Germans at Loos, the attack aroused great fear in the German trenches. In just five months, the British had developed a similar poison gas.

Over the following months the armies on both sides of the front saw gas choke their own soldiers if the wind changed direction, and it was therefore clear that they had to develop a new technique that was not dependent on the weather conditions. The solution was gas grenades as they could be fired over enemy territory.

But the main innovation was not grenades. In his chemistry lab Haber and

TECHNOLOGY........... CULTURE.............. ECONOMY..... EVERYDAY..........

From urine cloth to gas mask

100,000 cotton pads dipped in a solution of baking soda. This protection was given to Allied soldiers after Germany's first gas attack. When chlorine dissolves in moisture, any wet cloth could in principle be used, and the soldiers were told that in case of emergency they could wet a cloth with urine. During the war, army scientists developed modern gas masks with chemical filters. Even the army's horses and dogs were fitted with gas masks.

VICTIMS: gas attacks gave World War I horrors a new dimension. With increasingly effective poison gases like phosgene and mustard gas, a single well-planned attack could kill thousands. Here Italian soldiers are victims of the gas.

his team had a new chemical weapon up their sleeve. On 19th December, 1915, after a six-month break in German gas attacks on the Western Front, the Germans won with an even more deadly poison gas.

PHOSGENE GAS CHEATED ALARM

At Ypres ridge the Germans' new secret weapon – phosgene gas – seeped towards the British soldiers. All along the front the British Army had set up a guarded alarm system that would warn the troops with bells at the slightest suspicion of a gas attack. But the Britons saw no gas cloud and did not notice the characteristic cough that chlorine gas normally triggered.

Phosgene gas was invisible and did not show its effect immediately. Therefore, it reached hundreds of unaware soldiers causing them to inhale large amounts of gas before coughing, nausea and convulsions spread, at which point the guards raised the alarm, and the soldiers put on their protective masks. The symptoms of phosgene gas could be delayed for hours or even several days before apparently healthy men collapsed and died.

The gas did not just kill enemy soldiers, but also wiped out all animal life. Even birds which nested in the tallest trees fell to the ground dead.

In July 1916 the British responded again and surprised German troops with their own version of phosgene gas during the Battle of the Somme. With repeated attacks and counterattacks, the gas war had developed into a race between the best chemists on both sides of the front. Every time the Germans attacked with a new kind of poison gas, the Allies copied the technology shortly after.

At the same time, scientists developed more and more advanced protection against the gases. Most important of all was the impromptu wet cotton cloths or pads that covered the mouth, which were replaced with gas masks with chemical filters that effectively purified the air of poison gas.

With new defence technology Germany's military command realised that neither chlorine nor phosgene gas could win the war for them, as they had hoped. But the ambitious and patriotic Haber would not give up.

MUSTARD GAS KILLED SLOWLY AND PAINFULLY

During 1916 Haber, along with the head of Germany's gas warfare troop and his staff, were working on yet another new poison gas that would surpass all former chemical weapons. During the first half of 1917 the

British chemist James Bert Garner developed the first mass-produced gas mask for soldiers in World War I.

> “ But as the hours passed their skin bubbled into yellow blisters ”

chemists composed a new formula – a gas with the smell of mustard that they called mustard gas.

During the night of 12th July, 1917 German forces fired the first 50,000 shells with mustard gas at enemy positions at Ypres. As with phosgene gas the victims on the other side of the front were not aware of what they had been attacked with, but as the hours passed their skin bubbled into yellow blisters, the soldiers' noses began to bleed, they became short of breath, convulsing, vomiting and burning with fever. Diarrhoea flowed from their bodies while writhing in pain from internal bleeding and cruel gas burns. Many also lost their sight, wandering around blindly and had to be led away from the front in rows with their hands on each other's shoulders. But the survivors were not yet out of danger. At the field hospital outstations nurses patiently attempted to tend the gas burns or at least soothe the pain. The torment could drag on for a whole month before soldiers either found relief from their suffering or died. One month after the first attack more than 15,000 British soldiers were added to the list of the victims of mustard gas.

Hitler was hit by mustard gas

As before, the British soon copied the Germans' new poison gas. It was something German runner Adolf Hitler also experienced on the night of 13th October, 1918 in the trenches of Ypres:

“Toward morning I, too, was seized with pain which grew worse with every quarter hour, and at seven in the morning I stumbled and tottered back with burning eyes; taking with me my last report of the War. A few hours later, my eyes had turned into glowing coals; it had grown dark around me”, Hitler later wrote in his book *Mein Kampf*.

Poison gas killed 92,000 soldiers

From the beginning of 1918 the Germans produced 1,000 tonnes of mustard gas a month, but both sides of the front also had new and potentially even more lethal chemical weapons under development. One of them was the American gas lewisite, an even more dangerous form of mustard gas. The British experienced deaths among workers who produced mustard gas and moved away from this type of gas at the end of the war, but in turn had developed an arsenic-containing smoke that could penetrate all known gas masks. The Germans had invented the terrifying Gaswerfer in 1918 – a deadly mortar-like weapon that could spread large amounts pumice granules impregnated with phosgene gas over large areas.

At the end of the war every fourth grenade fired on the Western Front contained poison gas, and in all the Germans used 68,000 tonnes of gas during World War I, while the British and the French respectively fired 25,000 and 36,000 tonnes. 1,250,000 soldiers were injured by poison gases, of which

92,000 died. While poisoned soldiers fell at the front, Haber defended his inventions stating that a dead soldier was a dead soldier, regardless of the weapon that had killed him.

After the war, he received the Nobel Prize in Chemistry for his development of chemical fertilizers. Before the war his research had secured food for millions of people; During the war he had invented a weapon that maimed and killed thousands. Haber even commented paradoxically with the words:

"During peacetime a scientist belongs to the world, but in wartime he belongs to his country".

1,250,000 soldiers were wounded in poison gas attacks throughout World War I.

HABER WAS EXILED

In the interwar period Haber continued his work and invented the firedamp whistle for miners. One of his major projects was an attempt to extract gold from seawater. Haber still held his fatherland dear and was determined find a way to help Germany pay the war reparations that the country had been subjected to by the war's victors in the Treaty of Versailles. He set off to sea with his team of scientists, but returned home crestfallen without the slightest result. Haber took the failure of gold mining heavily and was hit by a deep depression.

The Nazi takeover in Germany was the beginning of the chemist's final collapse. In the first months under the Nazis he was still working as a chemist and his developments included the poison gas Zyklon A and its successor Zyklon B, which was later used to execute Jews and other outcasts in the Nazi gas chambers. But despite his abilities as a scientist and his patriotism, Christian Haber's Jewish background put an end to his career. One day he arrived at the Chemistry Institute in Berlin to be greeted by the message: "Jews not welcome here".

Haber sought out work at Cambridge University, but met resistance there. On his way to Palestine a few months later he became seriously ill and died in Basel in Switzerland of a heart attack on 29th January, 1934.

The Nazis did everything to avoid marking the Jewish chemist's death, but Haber was nonetheless remembered at a ceremony in Berlin a year later. Many of the chemist's former colleagues were banned by the Nazis and instead sent their wives to the commemoration. ■

Prepared for a gas attack: a team of British soldiers play football wearing gas masks at the front in northern France, 1916.

POISON GAS SCARRED SKIN AND LUNGS

The invention of chlorine gas saw World War I turn into a race between chemists, who worked day and night to develop the deadliest formula.

TEAR GAS

■ **Use the first time:** August 1914

■ **Symptoms:** tears, sneezing and coughing

■ Tear gas irritates the mucous membranes of the nose, eyes and lungs and causes tears, sneezing and coughing, but is rarely fatal. When French soldiers tested tear gas against the Germans, the concentration was too weak and the Germans barely felt the gas.

CHLORINE GAS

■ **Use the first time:** April 1915

■ **Symptoms:** cough, death

■ Chlorine gas dissolves in moisture from the victim's skin and the mucous membranes of the eyes, nose, throat and lungs, where it is converted to hydrochloric acid and corrodes lung tissue.

PHOSGENE GAS

■ **Use the first time:** December 1915

■ **Symptoms:** cough, fluid on the lungs and death

■ Phosgene gas is invisible and odourless. Therefore, the victims inhale large quantities of poison before symptoms of the deadly gas are felt.

MUSTARD GAS

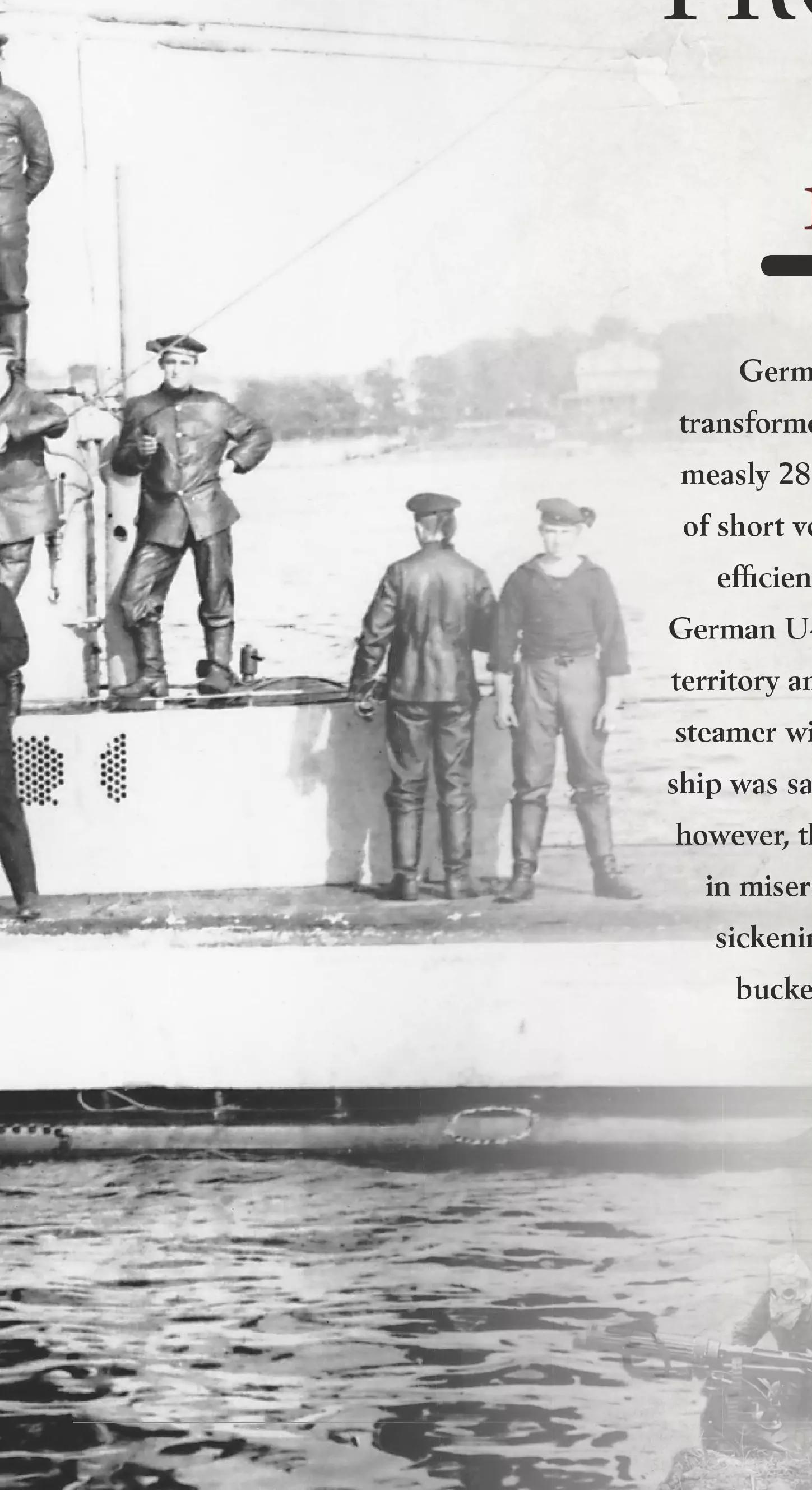
■ **Use the first time:** July 1917

■ **Symptoms:** burns, blindness, vomiting, diarrhoea, fever, internal bleeding, death

■ Mustard gas is absorbed through both the respiratory tract and skin and is therefore difficult to guard against. The poison gives watery blisters and burns. If inhaled it destroys the mucous membranes of the lungs. The gas killed thousands during World War I.

At the field hospital outposts nurses attempted to soothe the pain of mustard gas burns.

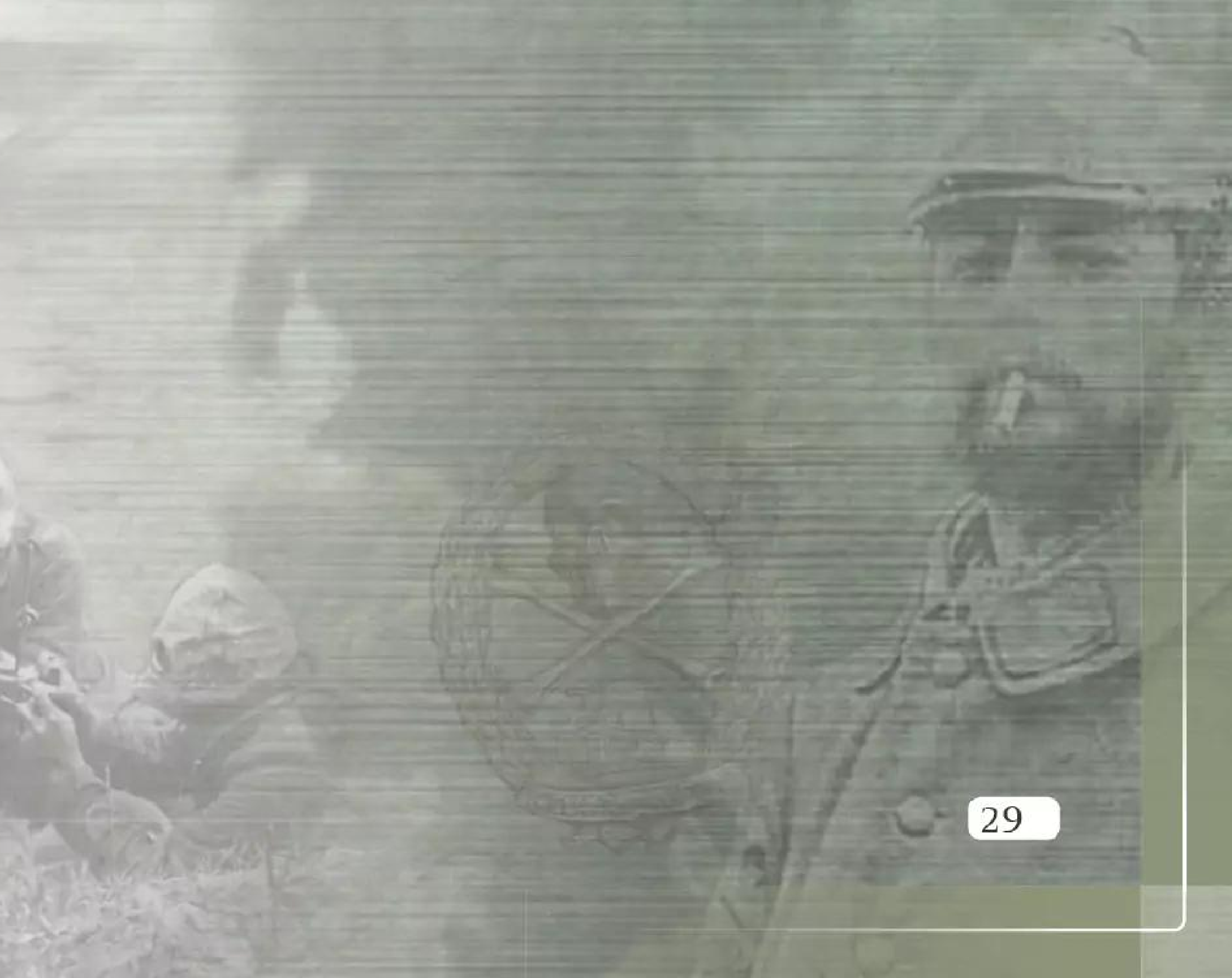
S.M.UNTERSEEBOOT U 53

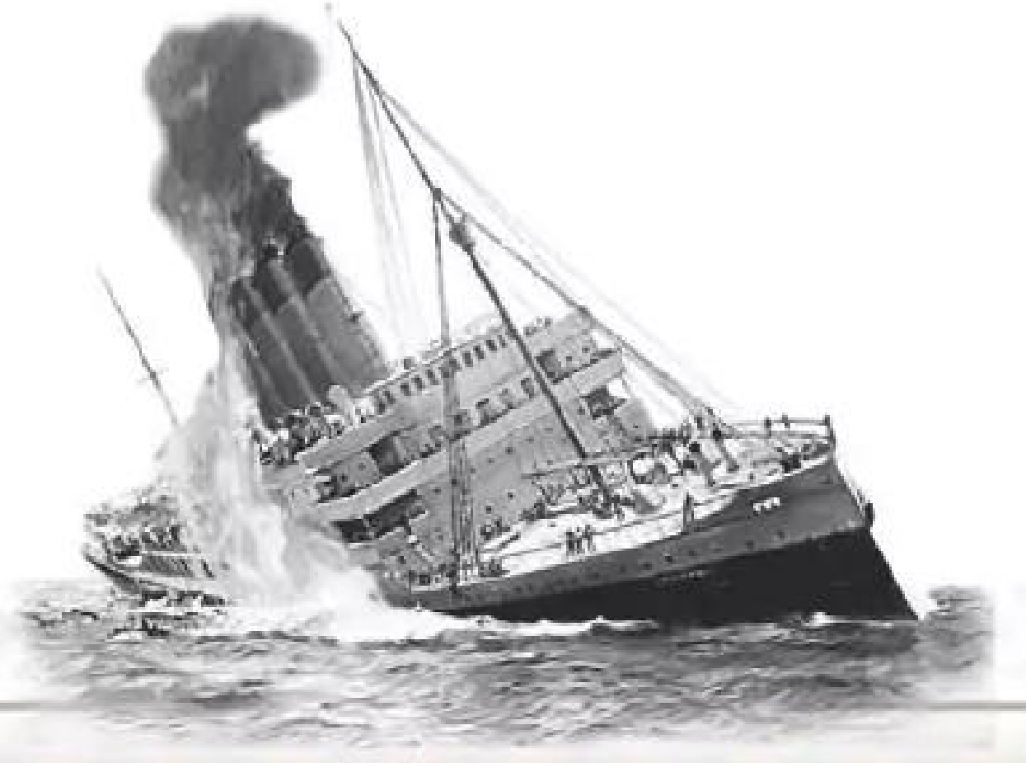


THREAT FROM THE SEAS

1914-1918

Germany's submarine fleet was transformed during World War I, from a measly 28 primitive vessels only capable of short voyages to a fearsome school of efficient killing machines. The new German U-boats crept unseen into enemy territory and could sink a giant passenger steamer with a single torpedo. No British ship was safe in the Atlantic swells. Inside, however, the submarines crews struggled in miserable conditions in which the sickening oil haze and smelly privy buckets were an integral part of everyday life at sea.





1914-18

1914: Germany enters the war with only 20 operational submarines.

1915: *U-20* torpedoes passenger steamer *Lusitania*.

1916: *Deutschland* becomes the first ever submarine to cross the Atlantic Ocean.

1917: German fleet declares unrestricted submarine warfare.

GOTT STRAFE ENGLAND

1918: German *UB-116* is destroyed by a British mine.

1914 »» 1915 »» 1916 »» 1917 »» 1918 »»

British ship Mantola, full of silver, was torpedoed in 1917 by a German submarine and sank to 2,500 metres depth. In 2011 the wreck was found.

The German submarine *U-24* cut its way through the icy, stormy waters of the English Channel on New Year's Eve, 1915 when men from the lookout tower suddenly saw a column of smoke.

"Smoke-clouds on the port bow! Looks like an enemy", came the call from the frozen men. *U-24's* commander Kapitänleutnant Rudolf Schneider rushed to the bridge and was immediately aware that they had spotted a group of British warships, standing in line like ghosts, and lit by the moonlight on the distant horizon.

"Full speed ahead! Diving-stations!" commanded the captain, and shortly after the *UB-24* disappeared under the water and headed towards the British, like a predator from the depths. The entire crew was filled with excitement.

"In the minds of one and all was the single thought: 'If only we can get at the English", recalled engine-room artificer, Nikolaus Jaud.

Both engines were set to full throttle and with her steel hull trembling, *U-24* headed towards the enemy vessels. When it reached the battleship *HMS Formidable*, the captain ordered:

"Fire the port torpedo". The submarine shook briefly as the underwater missile rushed out of its pipe, and a loud bang indicated that it had hit its target. *HMS Formidable* began to list, but remained afloat. Kapitänleutnant Schneider set off another torpedo to give the battleship its death knell, but shortly after the crew heard a deafening roar from the submarine's steel side, and all the lights went out. The *U-24* banked to port and sank, landing on the seabed 47 metres below sea level. In its attempt to finish off the sinking British ship, the German submarine had accidentally hit *HMS Formidable's* hull.

***U-35* was** the Germans' most successful submarine. It sunk 226 enemy ships during the war.

STUCK ON THE BOTTOM

The crew inspected the *U-24* for damage, but they found to their relief that there was none. It was not long before a bizarre sound on the submarine's hull put the sailors on alert again.

"Able Seaman No 1 expressed the view that a diver was drawing a net across us. The noise came nearer and nearer, and it really sounded as though a diver in his lead shoes was shuffling across the deck", recalled Jaud. The sound was found to come from a stone clattering across the deck from a ground swell.

During the night the crew managed to put the submarine back in order, and the next morning the *U-24* was able to rise to the surface and begin its journey back to the submarine base at Zeebrugge on the Belgian coast. Despite its unexpected night on the ocean bed the mission had been successful. The *U-24* had sunk one of the British warships that blocked supply lines to the German ports.

Few in the German navy had dared hope for success when Germany's 28 submarines, of which only 20 were operational, were finally made combat-ready in the summer of 1914. Despite their superiority to other submarines, the petrol-powered submarines were still primitive and vulnerable. They only accommodated small weapons and emitted a tell-tale trail of exhaust smoke as they sailed on the surface. The Imperial Navy had only built its first submarine just eight years before the outbreak of war, and none of the navy's sailors were experienced fighters under water.

SAILORS TOOK OPIUM BEFORE RAIDS

German security officer Johannes Spieß was not impressed when he first went on board one of the fleet submarines – the 57-metre-long *U-9*. In his memoirs, he first noted the stuffy air, the smell of petrol and the submarine's complex technical equipment. The *U-9* was, with few

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EYEWITNESS

SAILOR W SCHLICHTING, ***North Sea***

AIR WAS SICKENING

"The damp, warm, almost stifling air, saturated as it was with oil, made me feel sicker than ever. Before I lay down I swallowed a little tea, and glanced into the engine room; an appalling burst of heat flung me backwards... The men were standing over their engines in the bare minimum of clothing, and their drawn, gaunt faces, smeared with oil and filth, looked like skulls... The thudding combustion engines exhausted such fresh air as could be pumped through the ventilators, and what remained of it was not enough to lighten the prevailing atmosphere."

The crew, in this German submarine lived side by side with noisy engines that sent a heavy stench of oil through the entire vessel. The engine room was – like the rest of the submarine – a cramped workplace.

In peaceful moments, German sailors could take a break on the deck.

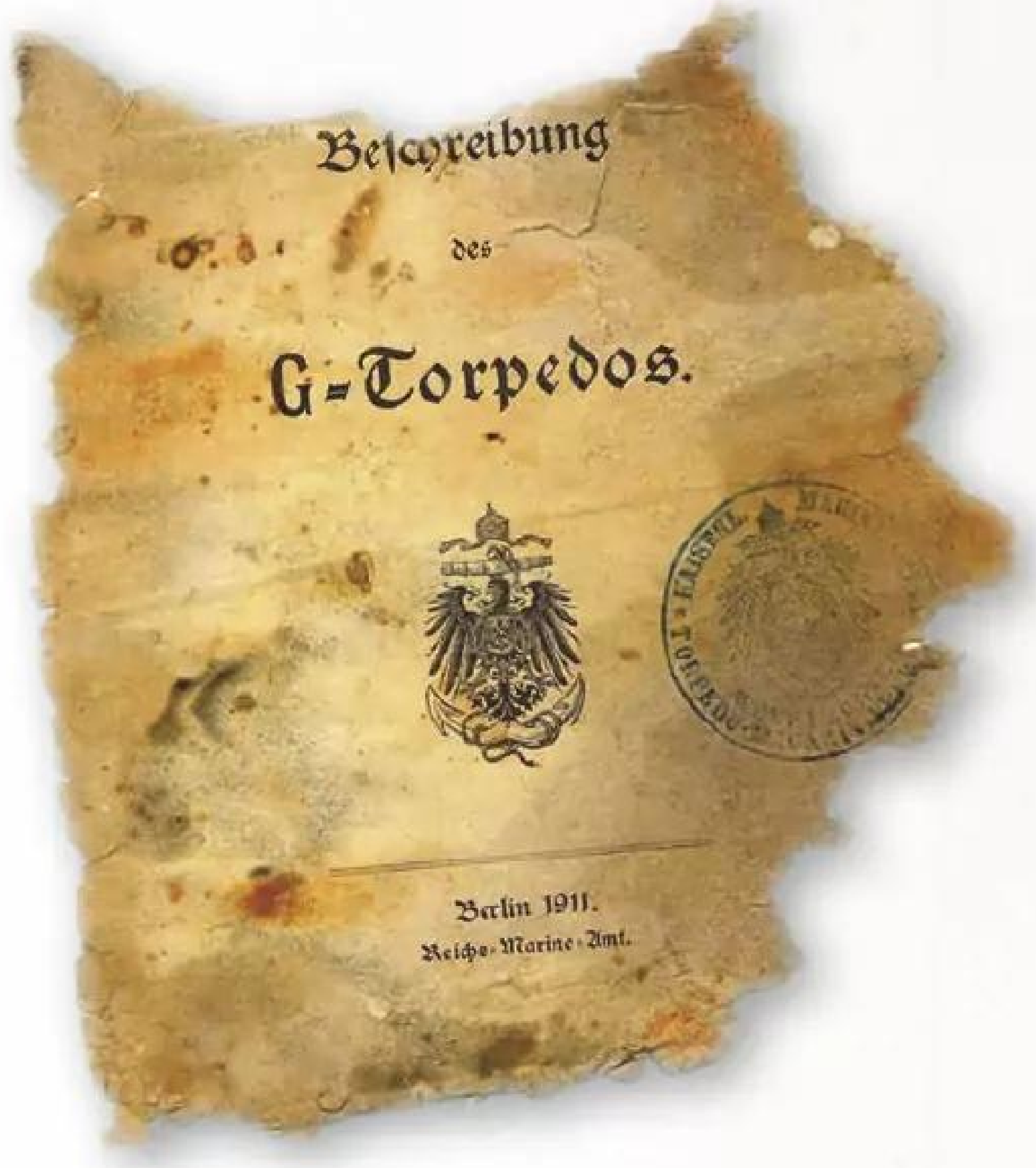
“When the crew lay down, condensation dripped down on their faces”

>>>> exceptions, identical to the German submarines numbered *U-5* to *U-18*, and all took part in raids during World War I.

The vessels were divided into eight rooms and a control tower. At the very front and at the rear were the torpedoes, in the middle of the ship the captain and officers had their cabins, and the crew’s conditions were so cramped that some had to sleep in hammocks. In addition, the submarine contained an engine room and a control room from where the mate navigated.

The crew room also served as a galley, but according to Spieß, the electric hob and bake-oven always short-circuited, so the crew had to prepare food on a burner up on deck. The submarine’s privy for the 29-man crew, was placed in a corner of the control room, only shielded by a curtain.

“After seeing this arrangement, I understood why the officer I relieved recommended the use of opium before all cruises which were to last over twelve hours”, reported Spieß. Opium soothed not only the nerves, but also caused constipation.



Beſchreibung

des

G-Torpedos.

Berlin 1911.
Reichs-Marine-Amt.

A torpedo manual was found in the wreckage of the German submarine UC-47.

Condensation ran to moisture

When the crew went to sleep, condensation dripped down onto their faces from the sides of the submarine because of the large temperature difference between the cold sea water outside and the high temperature inside, which made the inside of the submarine resemble a damp basement. The sailors also awoke in their bunks with bunged-up noses and so-called “oil head” from the bad air. In those primitive and harsh conditions, on 6th August, 1914 Spieß took on his first raid in the German submarines of World War I. 10 of the Imperial Navy’s submarines were sailing north to a line that crossed the North Sea from Norway to the Orkney Islands, and from there they were to attack the British fleet that patrolled the North Sea and the English Channel. After the outbreak of war the British had created a blockade to prevent all freight deliveries to Germany from calling at German ports.

Expeditions with no catch

Spieß recalled the feeling of finding themselves all alone on the sea – and at war – at the moment after the U-boats set sail from their base on Heligoland, and after the four accompanying ships had left them. Every moment Spieß expected to spot the British naval vessels. But the crew of the *U-9* weren’t so lucky. When the boats returned from the voyage, they had not hit a single enemy ship, but in return had lost a submarine that had been rammed by a British warship.

On his first mission Spieß saw the German submarines’ weaknesses up close: for example, from the deck of the *U-9* he could clearly see the revealing white smoke from the other submarines’ petrol engines when sailing on the surface. Even at night the engines revealed the submarines’ positions because they were noisy and sent sparks and flames through the chimney. The problem could be solved by using the battery-powered motors, but battery power was limited, and they were designed primarily for sailing beneath the surface.

Another weakness was that it took up to eight minutes for the submarine to dive. The crew had to first start the electric motors, fill the tanks and close the tower hatch. The eight minutes could prove fatal if at that moment the enemy appeared.

When the submarine first dived, it manoeuvred just below the surface, the mate looking through the periscope that on early vessels were only 4.5 metres long. When they sailed at the so-called periscope depth in heavy seas, the vessel was exposed to the enemy, and it therefore required calm conditions if the crew were going to use the periscope.

Throughout August 1914 none of the German raids came to anything. And after losing two submarines and with the constant hassle of engine problems on several other vessels during the war’s first months, the German submarine effort appeared to be a failure.

However, before the outbreak of war German marine engineers were in the process of solving some of the submarines’ shortcomings. Some of the vessels that sailed in August 1914 had diesel engines instead of the smoky petrol engines. One such vessel was the *U-24*, which engineer Nikolaus Jaud had spent the night on at the bottom of the ocean on New Year Eve 1915.

New submarines were invisible

All new submarines that launched from the shipyards after the outbreak of war had been fitted with diesel engines. After their initial teething problems, the Germans now commanded a submarine fleet with invisible exhaust and far quieter engines that were able to sail much further on less fuel. Naval crews could now make longer and more distant voyages.

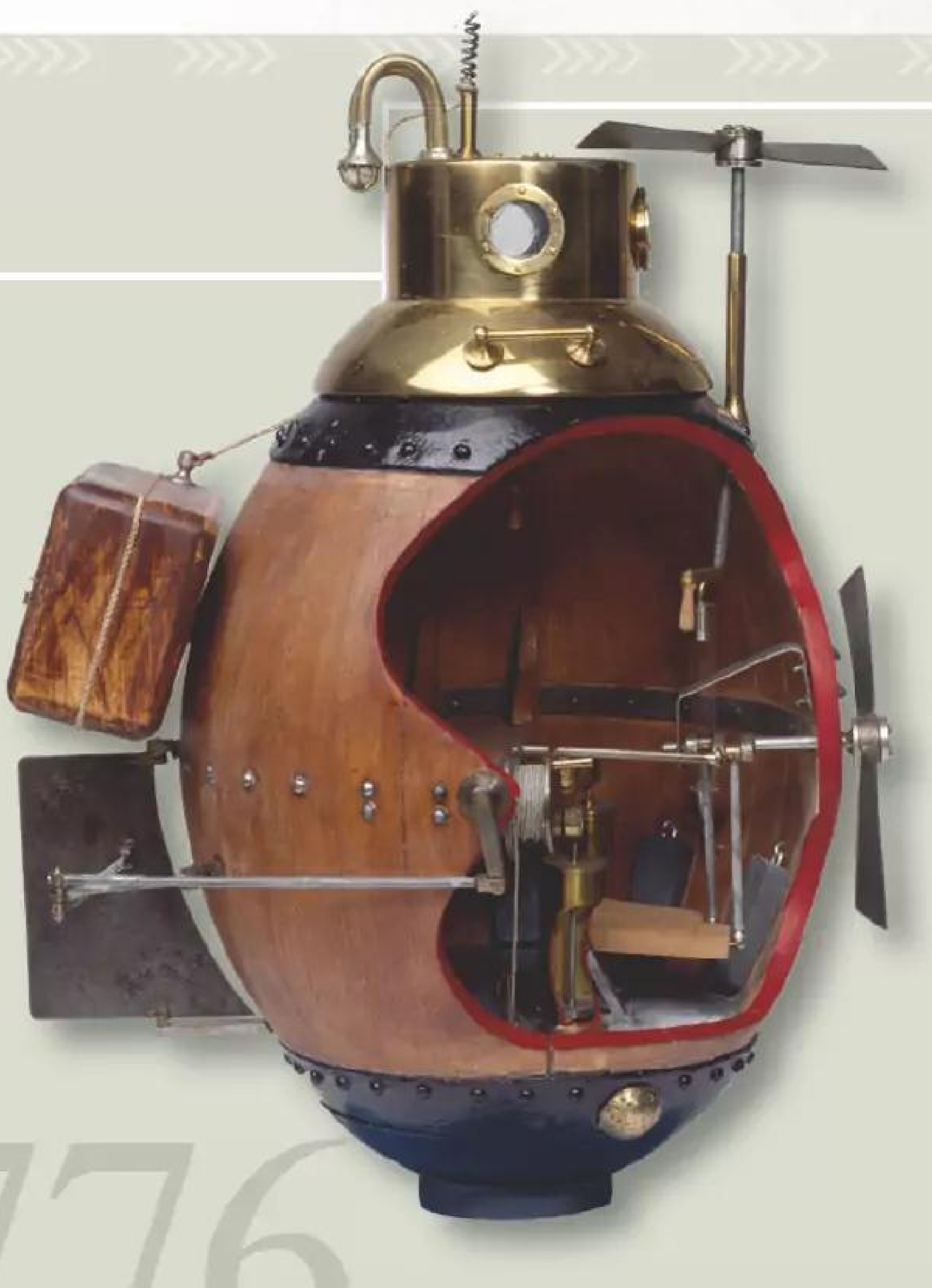
When the vessels were gradually equipped with longer periscopes – first at 6.2 metres, then 7.5 metres – they could also

FROM WOODEN BARREL TO STEEL MONSTER

Inventors had been trying to develop a submarine that could defeat the enemy for centuries when World War I broke out.

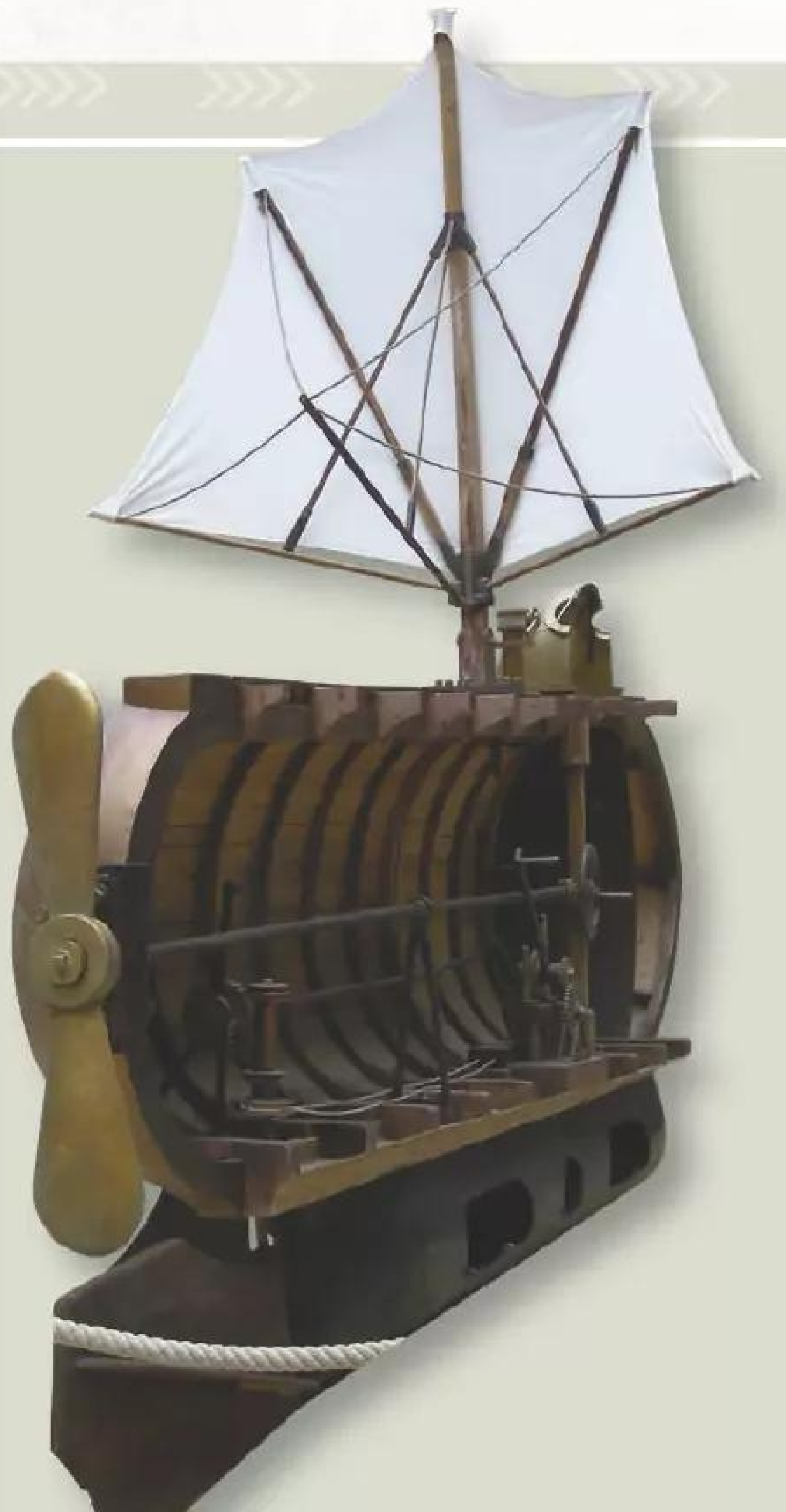
1776

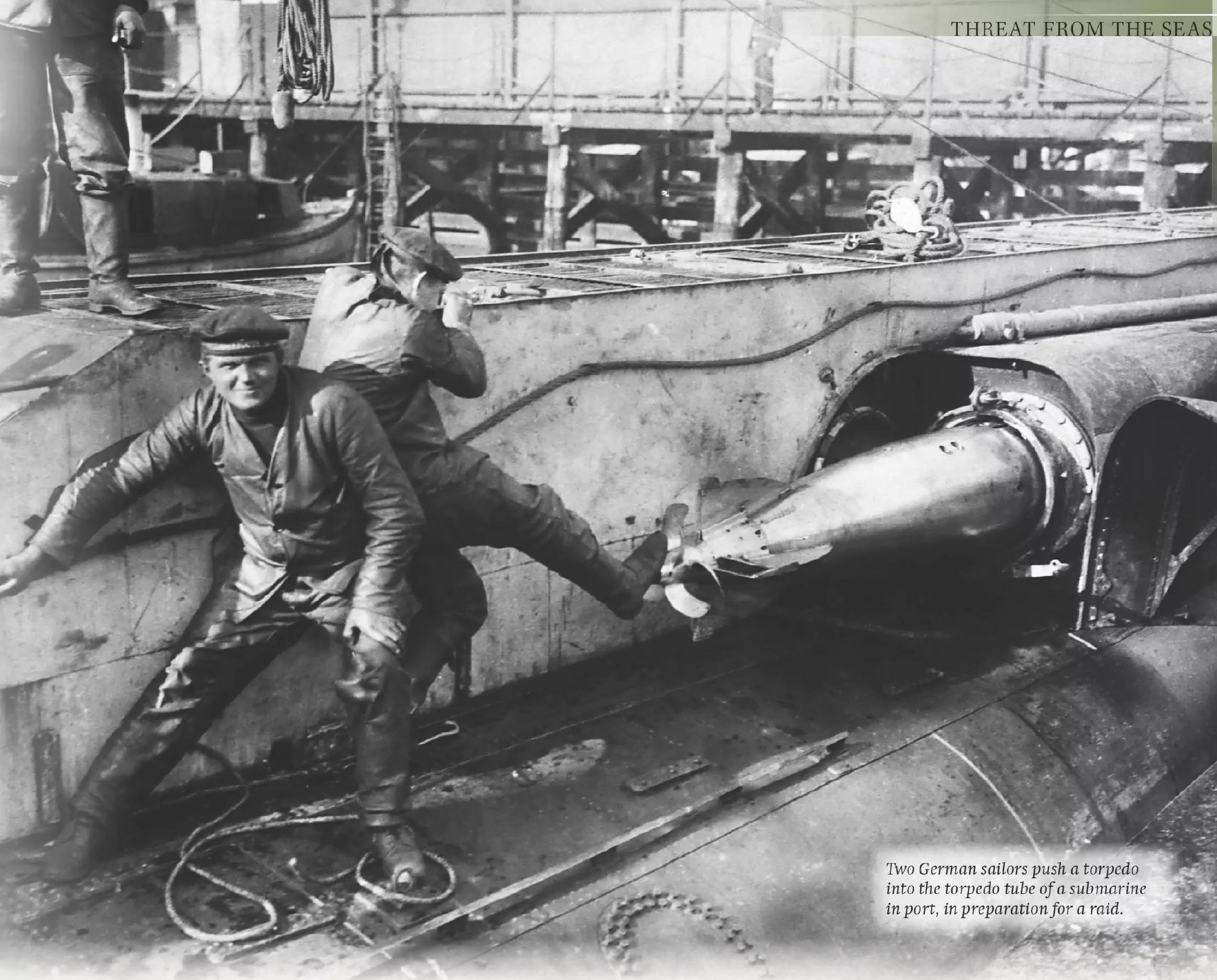
The submarine ***turtle*** – invented by the American David Bushnell – was the first used in combat during the American Revolutionary War.



1800

American Robert Fulton designed the submarine ***Nautilus*** to place mines on enemy vessels. From the surface the seven-metre-long submarine ducked under the sea with the power of a hand-operated screw. *Nautilus* was able to dive for one hour.





Two German sailors push a torpedo into the torpedo tube of a submarine in port, in preparation for a raid.

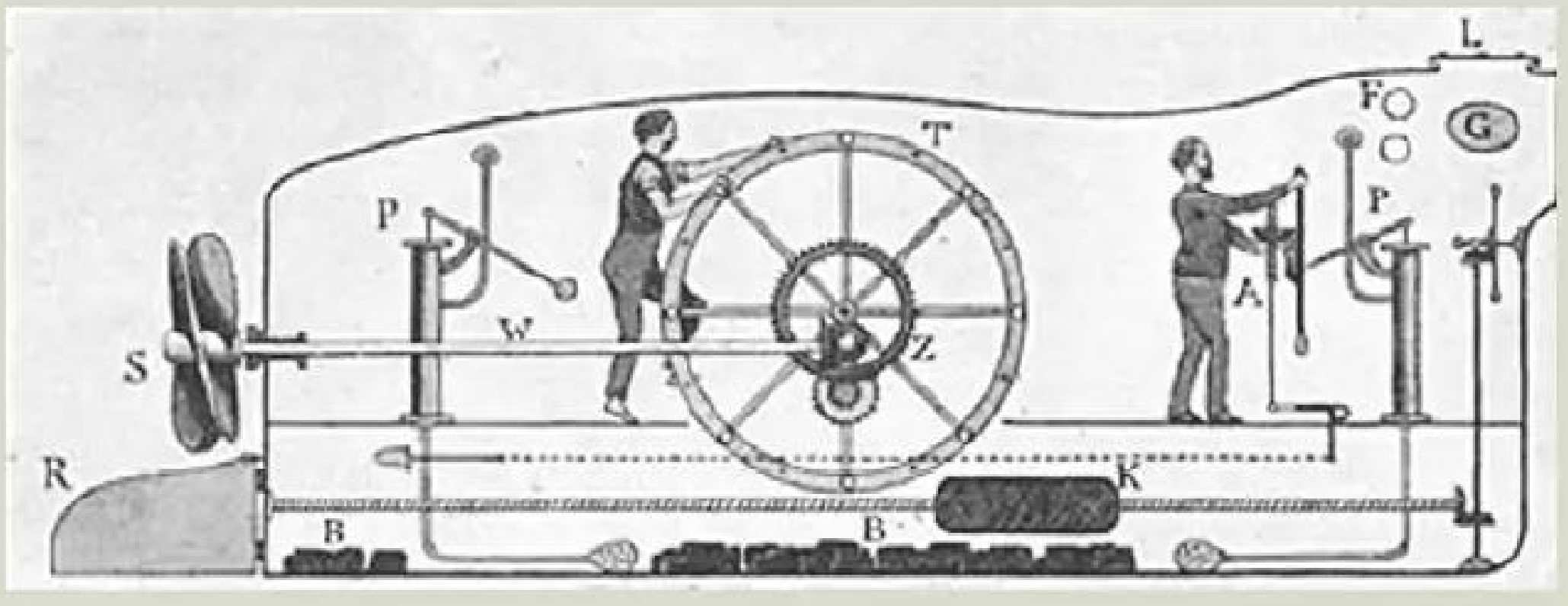
sail unseen, while the crew could keep lookout through the periscope.

To start with, German strategists in the fleet had used submarines to break the British blockade that had detained, sunk or captured 388 German and Austro-Hungarian ships at the start of the war, while 788 ships sheltered in neutral ports.

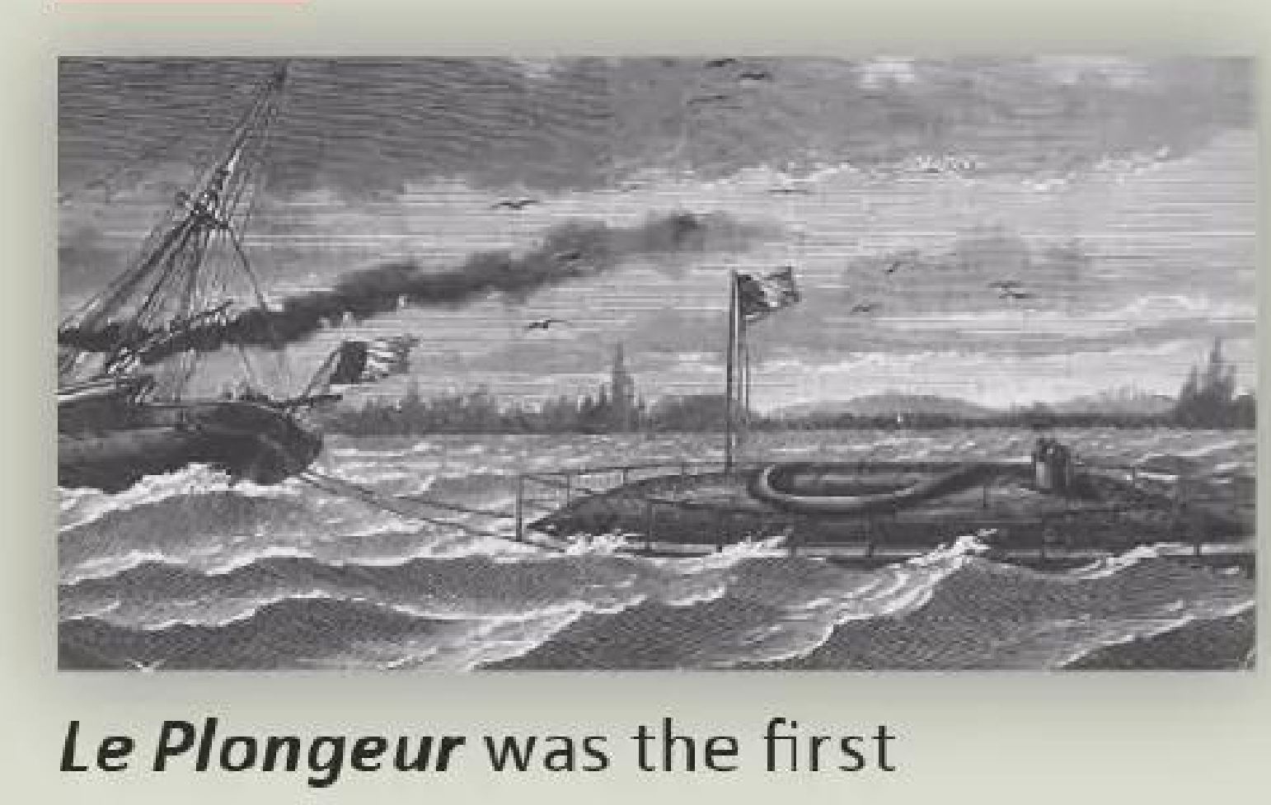
But with the improvements – especially the increased range – they could be used to attack larger prizes. The vessels were equipped with even more powerful torpedoes and deck guns. As the torpedoes were costly weapons, Germans used them mainly against warships, while they attacked merchant ships with deck guns or went alongside and set explosive charges on the vessel. The submarines now constituted a significant threat to the Entente Powers' trade and warships in the North Sea, the Mediterranean and the Atlantic Ocean. Even the United States, which at that time was not otherwise involved in the war, felt the threat from the Imperial Navy's submarines. Shock waves spread when in May 1915 German *U-20* sank the giant passenger steamer *Lusitania*, which was off the coast of Ireland on the way from New York to Europe. The submarine fired a torpedo that hit the luxury steamer side on,

1851

The eight-metre-long and 30-tonne steel submarine ***Brandtaucher*** was built by German Wilhelm Bauer to break the Danish Navy's blockade of German ports. It could dive almost 10 metres and required the crew to keep the screw constantly moving by turning a large wheel.



1863



Le Plongeur was the first submarine driven using engine power. Its 80-horsepower pneumatic motor gave *Le Plongeur* a top speed of 7.5 km/h. The submarine was almost 43 metres long to make room for the compressed air bottles on board.

1893

Bronze submarine ***Gustave zêde*** had the first success with a torpedo attack while it sailed beneath the surface. The 48.5-metre-long submarine could hit an enemy vessel at 250 metres.

and in just 18 minutes the *Lusitania* disappeared underwater. The ship's wreck had made it difficult to put lifeboats in the water, and when the ship sank, it took 1,198 passengers to their death on the ocean floor, including 128 Americans. Only 761 passengers survived.

AMERICANS CELEBRATED GERMAN SUB

Despite the *Lusitania* scandal a massive turnout of enthusiastic journalists and photographers huddled around the harbour in Baltimore on the US East Coast, when a German submarine – the first in history – crossed the Atlantic on 9th July, 1916. The crowd's eyes were locked on the spectacular vessel – the new German merchant submarine *Deutschland* – that had just arrived in port on a peaceful mission and was now in the process of anchoring.

When the submarine later pulled up to the quay, flowers rained down on the deck as a German-American orchestra set the tone by playing German tunes. The crowd on the quay cheered and applauded.

Officially the submarine had completed the two-week-long trip with a peaceful purpose, which, however, was also important for the German war effort: *Deutschland* would collect raw materials to take home from the US. In 1916 the German civilian population and the military arms industry were feeling the strain from the blockade. People were starving, and production ailing.

As *Deutschland* returned to Germany after nearly 14,000 kilometres at sea on 24th August, the submarine had collected 350 tonnes of rubber, 340 tonnes of nickel and 93 tonnes of tin in port. But the raw material itself was not the greatest gain. Most importantly, the Germans could be confident that with this new type of long-range submarine they could threaten shipping across the Atlantic.

DEUTSCHLAND BECAME A WARSHIP

After its second trip to the United States in November 1916 *Deutschland* and its six sister submarines passed to the German Navy, which converted them into warships. They constituted a formidable war machine, armed as they were with 18 torpedoes instead of the 12 that the war's earliest submarines carried, as well as two powerful deck guns with a calibre of 150 mm. Now the converted submarines would play a key role in the German Navy's new strategy, namely to attack the merchant ships carrying essential supplies to the British, thereby forcing Britain to capitulate.

> “German subs would be given carte blanche to sink all enemy merchant ships”

ATTACKS PRESSED BRITS

To achieve their goals the Imperial Navy threw all caution overboard and decided to step up the battle by declaring so-called “unrestricted submarine warfare”. Unrestricted submarine warfare stated that German submarines would be given carte blanche to sink enemy merchant ships without warning and without giving the crew time to reach the lifeboats. These were the new rules of the game.

On 1st February, 1917, Germany started an aggressive onslaught of unrestricted submarine attacks. The vessels went in search of their prey in the North Sea, English Channel and the Mediterranean Sea, the waters west of the British Isles and off the US East Coast.

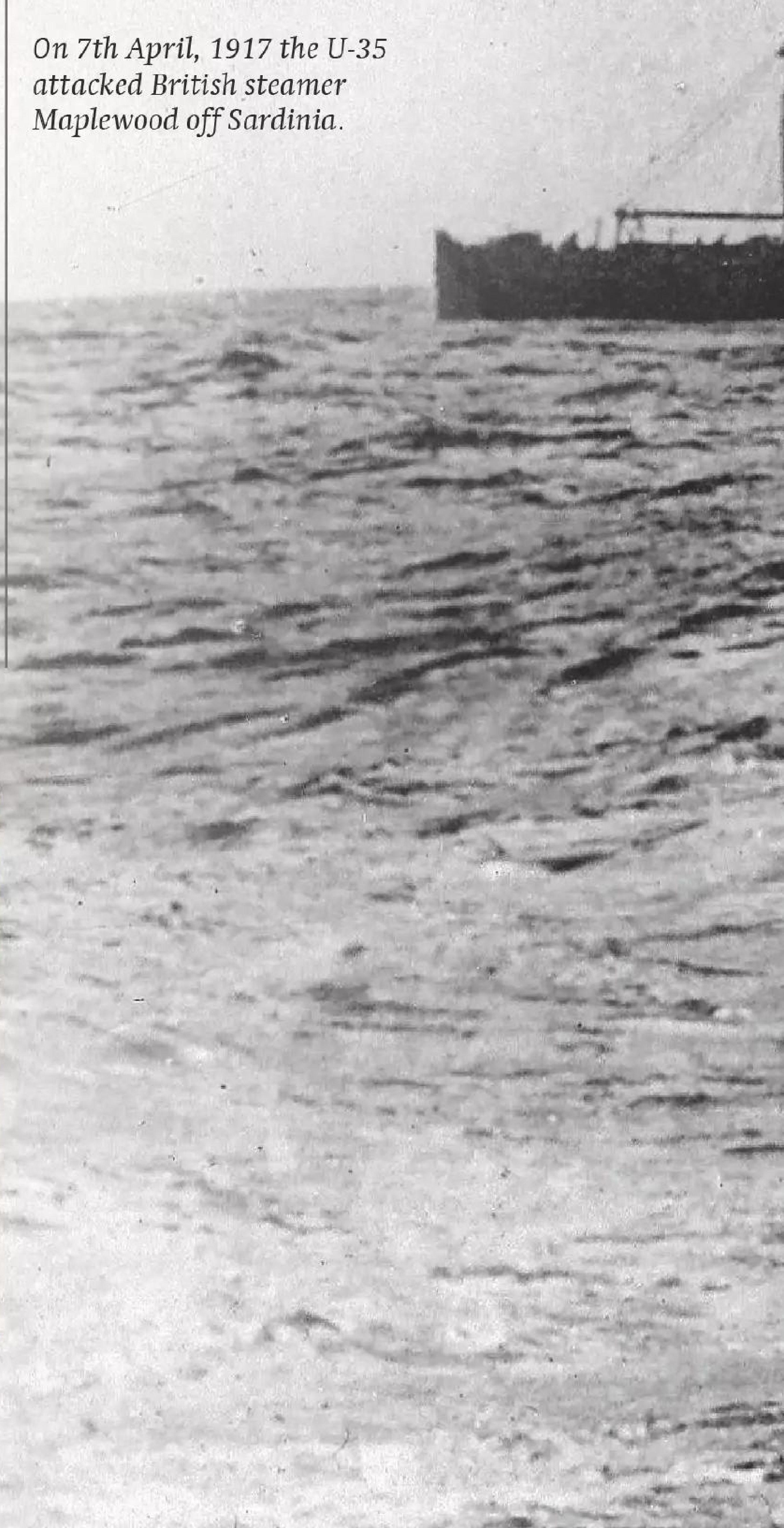
5,000
of 13,000 German submariners died in World War I.

To begin with, the German's massive submarine offensive was a success. It could put 60 of its approximately 150 vessels to sea at once, and between February and June 1917, U-boats helped sink a large number of merchant vessels that, by the Germans' own calculations, should have broken Britain.

In January 1917, the Imperial Navy sank 35 enemy ships; after unrestricted submarine warfare began, the numbers rose to 86 in February, 103 in March and 155 in April. One of them was *Deutschland*, now renamed *U-155*. The submarine turned out to be scarily effective on her first voyage as a war vessel in the summer of 1917 when she sank 19 Allied ships and bombed several targets in the Azores. The voyage turned out to be the longest submarine mission during World War I. The *U-155* sailed for over three months and completed nearly 19,000 kilometres, of which more than 1,000 kilometres were underwater.

The Germans successfully pressured the British. The number of merchant ships calling at British ports fell by 75 percent compared to an average year. Yet the Germans failed to force Britain out of the war. Even as the German torpedoes sent more and more Allied freighters to bottom of the ocean, at the same time, the British were developing their sea defences.

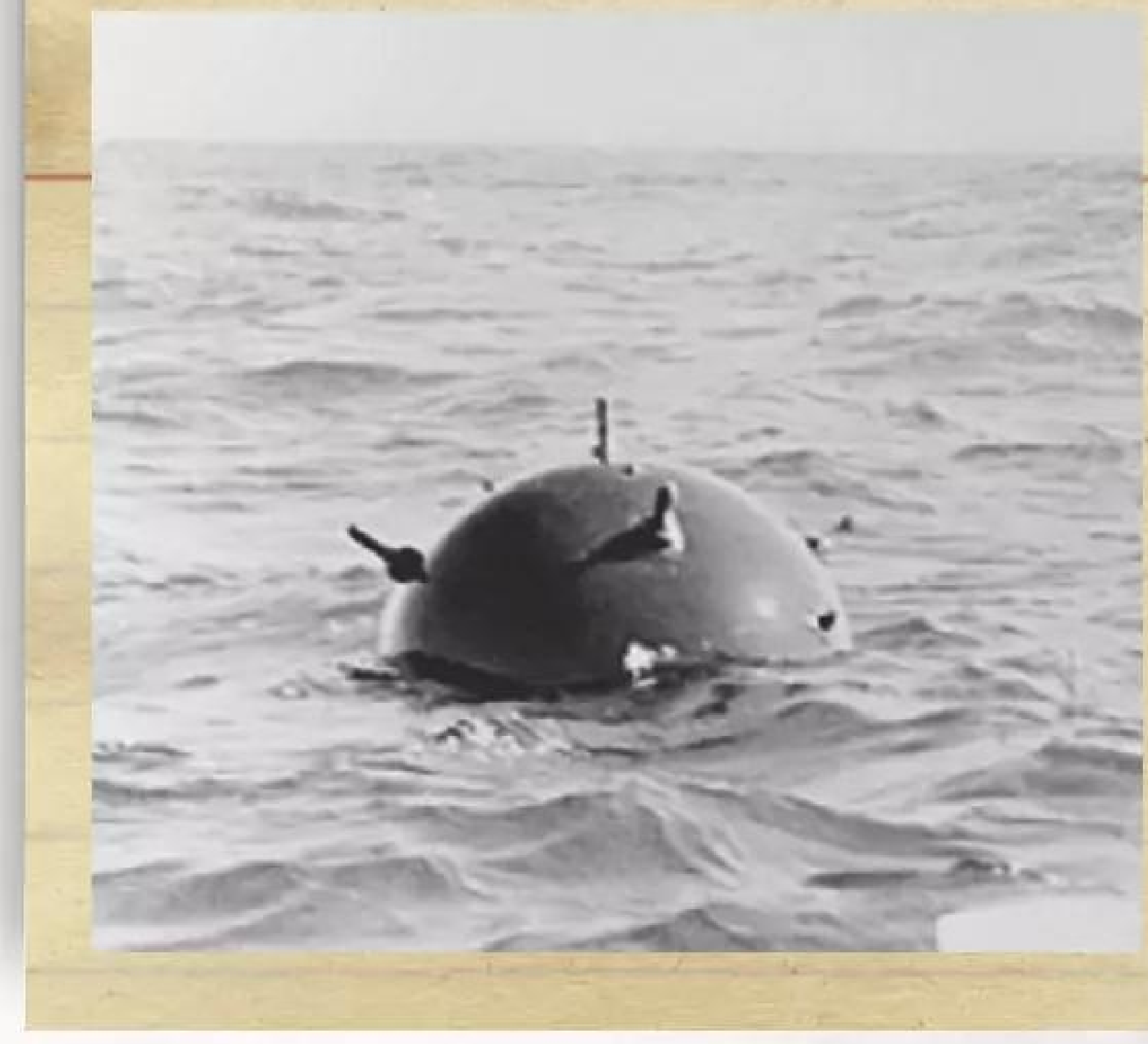
For example, they sent warships to escort



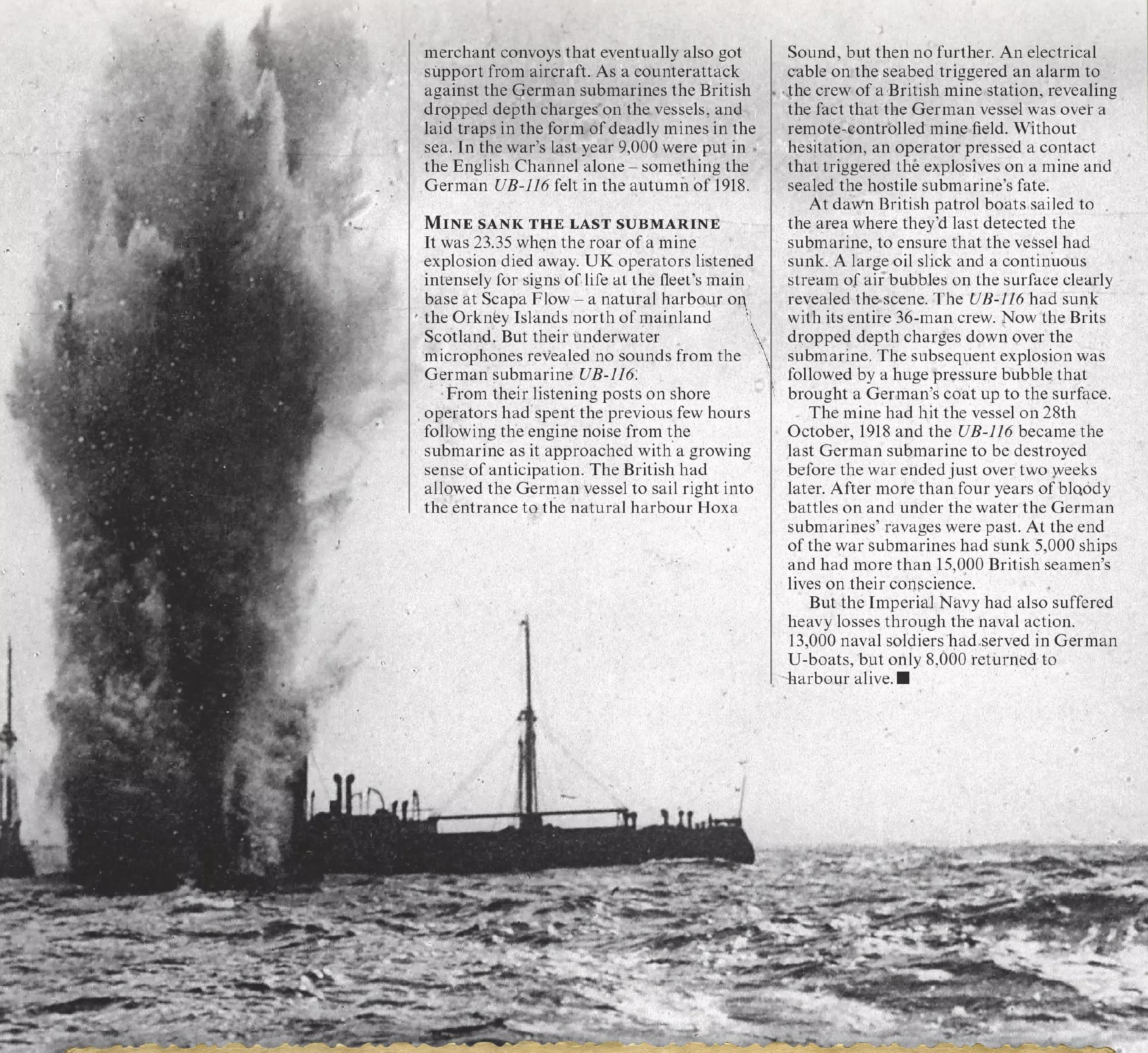
On 7th April, 1917 the U-35 attacked British steamer Maplewood off Sardinia.

TECHNOLOGY CULTURE ECONOMY EVERYDAY

Mines blocked shipping routes



During World War I mines were an important weapon against enemy vessels, particularly in an attempt to block sea lanes in the English Channel, where the British laid 9,000 mines in the war's last year. In many instances minefields forced German submarines to sail north of Scotland to reach their areas of operation. It gave them less time to hunt before their fuel ran out. During the war mines sank at least 34 – and possibly as many as 51 – U-boats.



merchant convoys that eventually also got support from aircraft. As a counterattack against the German submarines the British dropped depth charges on the vessels, and laid traps in the form of deadly mines in the sea. In the war's last year 9,000 were put in the English Channel alone – something the German *UB-116* felt in the autumn of 1918.

Mine sank the last submarine

It was 23.35 when the roar of a mine explosion died away. UK operators listened intensely for signs of life at the fleet's main base at Scapa Flow – a natural harbour on the Orkney Islands north of mainland Scotland. But their underwater microphones revealed no sounds from the German submarine *UB-116*.

From their listening posts on shore operators had spent the previous few hours following the engine noise from the submarine as it approached with a growing sense of anticipation. The British had allowed the German vessel to sail right into the entrance to the natural harbour Hoxa Sound, but then no further. An electrical cable on the seabed triggered an alarm to the crew of a British mine station, revealing the fact that the German vessel was over a remote-controlled mine field. Without hesitation, an operator pressed a contact that triggered the explosives on a mine and sealed the hostile submarine's fate.

At dawn British patrol boats sailed to the area where they'd last detected the submarine, to ensure that the vessel had sunk. A large oil slick and a continuous stream of air bubbles on the surface clearly revealed the scene. The *UB-116* had sunk with its entire 36-man crew. Now the Brits dropped depth charges down over the submarine. The subsequent explosion was followed by a huge pressure bubble that brought a German's coat up to the surface.

The mine had hit the vessel on 28th October, 1918 and the *UB-116* became the last German submarine to be destroyed before the war ended just over two weeks later. After more than four years of bloody battles on and under the water the German submarines' ravages were past. At the end of the war submarines had sunk 5,000 ships and had more than 15,000 British seamen's lives on their conscience.

But the Imperial Navy had also suffered heavy losses through the naval action. 13,000 naval soldiers had served in German U-boats, but only 8,000 returned to harbour alive. ■

CAMOUFLAGED SHIPS TRICKED SUBMARINES

As the Germans' submarine war intensified, the Allies had to find new attack and defence strategies. One example was the British Q-ships – warships disguised as harmless merchant or fishing vessels. The seemingly easy prey would entice German submarines to attack on the surface where the submarine was most vulnerable. Q-ships operated by an established procedure: when a submarine appeared, panic appeared to break out and, in the pandemonium, people hurriedly headed to the lifeboats to tempt the submarine crew to sail closer. Then the Q-ship's crew attacked the unprepared vessel with torpedoes and guns, which until then had been hidden in false deck houses or behind lifeboats. Q-ships were loaded with materials such as cork, wood or empty barrels, which would help keep the vessel afloat if it was torpedoed by the submarine. A total of about 200 Q-ships were not really very effective. Although they damaged the submarines they only sank about 10 and stopped operating in the middle of 1917.

GERMANS WIN IN THE EAST

1914

In August 1914 German and Russian armies clashed in the first major battle in the east. The Battle of Tannenberg was highly symbolic for the Germans from the beginning: it raged near the same village where in 1410 Polish forces had halted the Teutonic Knights expansion to the east. Now, hungry for revenge, German troops were again facing off against a Slavic army. And thanks to a retired general, Kaiser Wilhelm's troops were handed exactly the opening to the war on the Eastern Front they wanted.

1914

31st July: Russia gathers its forces ahead of an invasion of East Prussia.

17th August: Russians cross the border. Battle of Gumbinnen ends with a Russian victory and German retreat.

23rd August: Paul von Hindenburg and Erich Ludendorff take charge to restore the German attack.

26th August: Germans launch a counter-offensive and the Russians are soon in trouble.

14th September: Russians are driven out of East Prussia.

1914

Unlike the Western Front, the Eastern Front was a wide open space with room for troop movements.

“I’m ready”, retired General Paul von Hindenburg replied without hesitation to the telegram from Chief of the German General Staff Helmuth von Moltke. The commander of the German forces had asked whether Hindenburg was prepared to serve his country with immediate effect.

67-year-old Hindenburg was known as a military genius, and Moltke called him back from retirement after the Chief of Staff had received a call from the Eastern Front shortly before 21st August, 1914. The weak and uncertain voice Moltke had heard on the other end of the line belonged to General Maximilian von Prittwitz, commander of the German 8th Army in East Prussia. Prittwitz had reported his troops’ defeat at Gumbinnen to the numerically superior forces of the Russian 1st Army. Now the defeated general planned to pull his forces back.

Saint Petersburg was renamed Petrograd during the war because the old name sounded a little too German.

Prittwitz panicked

World War I had been running for just a few weeks, and the Battle of Gumbinnen near the Russian border had been the Germans’ first major offensive on the Eastern Front. Partly because of poor planning that gave the troops a short time to get in the correct position, the fighting ended with Russian victory and around 6,000 captured Germans. The sight of German soldiers fleeing for their lives had panicked Prittwitz. The entire 8th Army should – in his opinion – be withdrawn to the Vistula River, which runs through the middle of what is now Poland. Thus, he would abandon the whole of East Prussia to the Russians.

Moltke’s reaction was horror.

“At any rate, you must at all costs hold the Vistula”, he ordered down the phone.

Prittwitz argued, however, that he couldn’t guarantee anything, pointing out that the water levels in the Vistula were so low the Russians could wade across in many places. In addition, Prittwitz was greatly outnumbered: the Russian generals possessed an army of around 800,000 men against the Germans’ 200,000.

From retreat to attack

Prittwitz’s pessimistic calls to his superior sealed his fate as a military commander. When a furious Moltke ended the call, he quickly decided that Prittwitz was unfit to manage the forces on the Eastern Front. He relieved Prittwitz and his Chief of Staff Max Hoffmann and picked a more aggressive duo in the form of Hindenburg and General Erich Ludendorff, although Hoffmann was allowed to continue at the front as a staff officer.

At the same time, Moltke ignored protests from Hindenburg and Ludendorff and transferred several divisions from the Western Front to the east. Historians have pinpointed this decision as a fatal mistake: it weakened the German efforts to swiftly move through Belgium to outmanoeuvre and defeat the French army, forcing the Germans into a problematic war on two fronts.

Moltke, however, had been influenced by Prittwitz’s panic, and he feared the Russians could make it all the way to Berlin if they weren’t stopped in time. After the German defeat at Gumbinnen, the Russian 1st Army stood in eastern Prussia led by General Paul von Rennenkampf. Further south General Alexander Samsonov had also crossed the border with his 2nd Army.

When Hindenburg arrived on the Eastern Front on 23rd August, he immediately reversed the withdrawal order.

Hindenburg and Ludendorff thought the opposite to Prittwitz: that attack was the best form of defence. They therefore chose to give the green light for a plan of attack previously prepared by Hoffmann, but which had been trumped by Prittwitz’s panicked withdrawal order.

The offensive was to become the Battle of Tannenberg, one of the largest – and bloodiest – battles of World War I that was crucial to the overall war on the Eastern Front.

The battle also had great

As soon as the generals Paul von Hindenburg (left) and Erich Ludendorff (centre) took command on the Eastern Front, they launched a plan of attack devised by general staff officer Max Hoffmann (right).

symbolic importance to the Germans. It was at the village of Tannenberg in 1410 that armoured Teutonic Knights had lost a decisive battle against another Slavic invasion – this one involving King Władysław II Jagiello's alliance of Poles and Lithuanians. Now it was time for Germany's revenge.

Russians marched blindly

The Germans' attack plan set a cunning trap for the Russian forces, which took advantage of Rennenkampf's deep personal dislike of Samsonov – a dislike that harked back to the Russo-Japanese War in 1904-05. The Germans calculated that Rennenkampf, who had advanced from the north, would not come to Samsonov's rescue further south if he had a good pretext. As a result, the Germans placed their cavalry troops as a shield against Rennenkampf's troops – giving him the perfect excuse not to move south towards Samsonov.

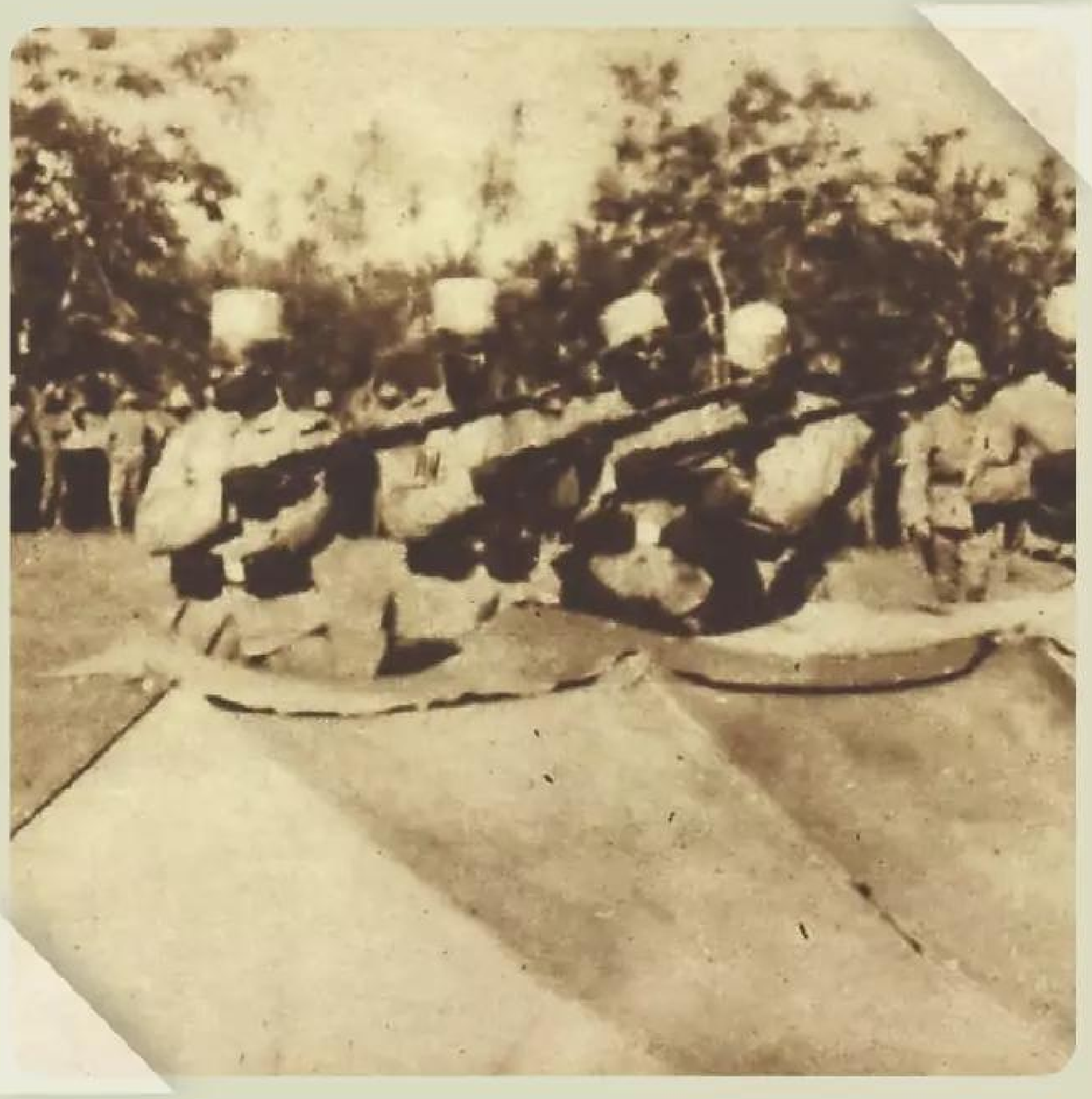
Meanwhile, the Germans transported General Hermann von François' I Corps by train all the way south to the vicinity of the small town of Monotowo in modern-day northern Poland. Here he was to engage Samsonov's 2nd Army from the left. The Germans' other two corps were ordered to be ready to move south to attack Samsonov from the right. The trap was taking shape.

It was a risky plan that could prove very dangerous for the Germans if Rennenkampf decided to turn south. In addition, the plan also required that the southern part of the defences at Königsberg – now Kalingrad – were left unmanned. The Germans had managed to intercept several Russian radio messages and a note from a captured soldier, and all these instructions clearly indicated that the Russians were heading straight for the trap, thus rewarding Hindenburg, Ludendorff and Hoffmann for believing in their plan.

MEANWHILE, IN AFRICA

BRITAIN AND FRANCE EXPELLED GERMANY FROM WEST AFRICA

Germany's colonies in West Africa – Togoland and Kamerun (roughly equal to present-day Togo and Cameroon) – quickly came under attack from British and French colonial forces. Togoland had no military – only police – and surrendered to the forces of the British Gold Coast and French Dahomey (now Ghana and Benin respectively) after just four days. Kamerun proved more difficult, where there were 1,000 German and 3,000 African troops. The British had to abandon an invasion from Nigeria because of the terrain and German ambush attacks, and the last major German territory only fell in November 1915 after several French and British attacks.



And as the Germans hoped, General Samsonov led the 2nd Army forward in the firm belief that there was no threat to his flanks. Thanks to the Russians' miserable communications system, he was completely unaware that Rennenkampf had temporarily halted his advance to allow his troops time to recover from the Battle of Gumbinnen – another Russian decision that fit perfectly into German plans.

Samsonov went to the front

When the German forces were in position on Samsonov's flanks, Hindenburg signalled the attack. In his memoirs, the old general wrote about the brutal skirmishes that took place during the battle's first day:

"26th August was the first day of the murderous combat which raged from Lautenburg to north of Bischofsburg. The drama on which the curtain was rising, and whose stage stretched for more than sixty miles, began not with a continuous battle line, but in detached groups; not in one self-contained act, but in a series of scenes".

The Germans attacked Samsonov's forces simultaneously from the front and on their flanks, and by the end of the day Samsonov's right flank collapsed.

Meanwhile, the commander of Russia's north-western front, Yakov Zhilinskiy, ignored all warnings about the massive German advance and directed Rennenkampf's 1st Army in the direction of Königsberg. This meant Rennenkampf's troops remained a considerable distance from Samsonov's 2nd Army and could not help in the battle against the German armies.

Disastrously for Samsonov, the Germans intercepted Zhilinskiy's order to Rennenkampf. Hindenburg saw the chance to inflict a decisive defeat on Samsonov. The 1st Reserve was drawn from Bischofsburg to strengthen the German centre, and the X Corps were sent to the south to meet with General François' I Corps. Now the trap was ready – Samsonov would soon find himself surrounded.

On 27th August the German I Corps attacked Samsonov's left

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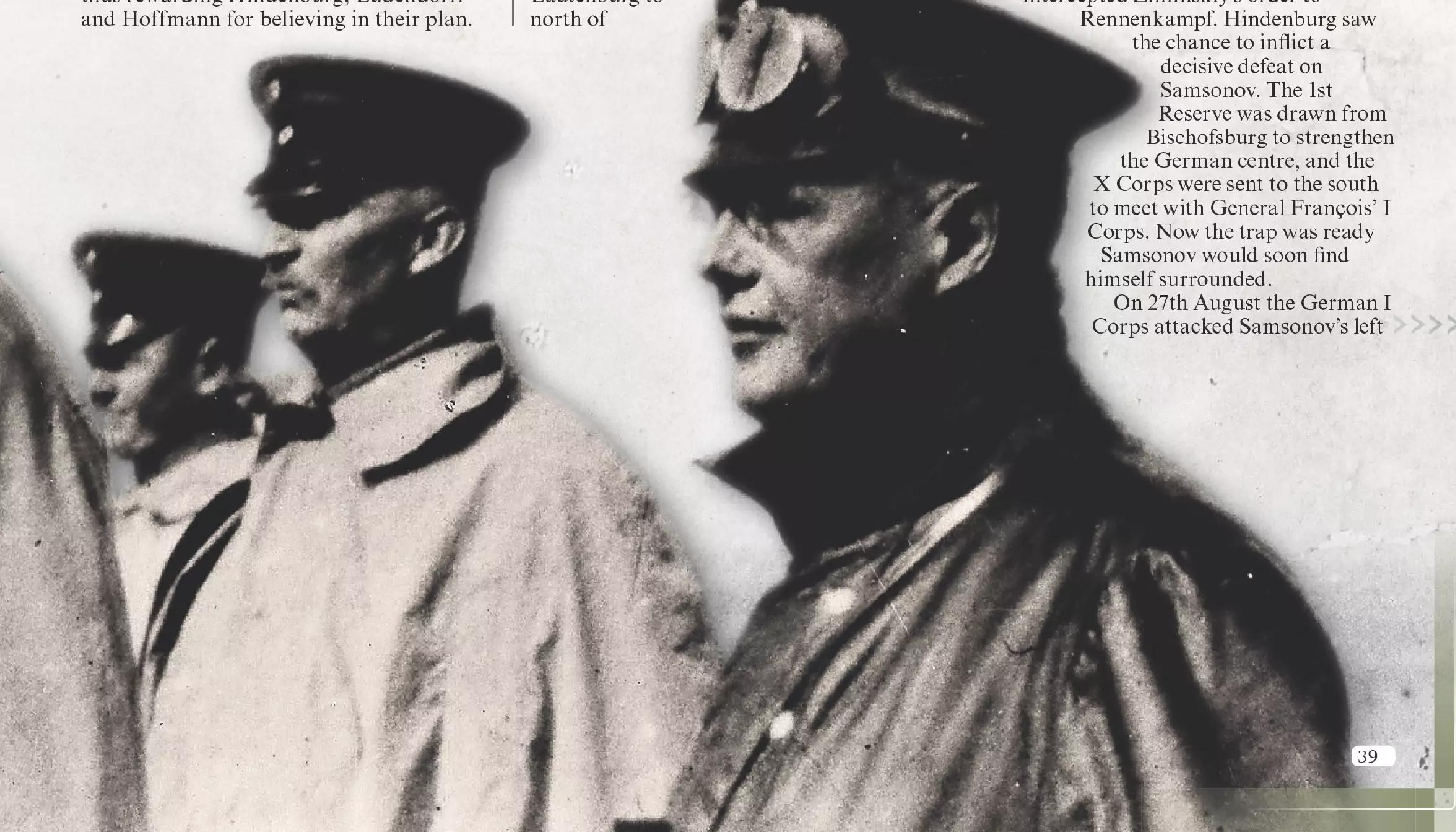


> “It took 60 trains to transport the captured armaments to Germany”

Russians struggled with outdated Mosin-Nagant rifles.

flank with great success as the Russians were driven back to the border, allowing the Germans to completely cut off the already poor lines of communication between Samsonov and the rest of the Russian army.

The following day Samsonov transported himself to the front to personally lead his XV Corps. The scale of the trap had begun to dawn on him, but he considered himself still able to fight it out. When he arrived at the village of Waplitz, where the XV Corps resided, Samsonov embraced the corps' commander and exclaimed sadly: “You alone will save us”.

The XV Corps fought bravely: as night fell, both army flanks were in full retreat, but the centre where the XV Corps were, remained intact.

On 29th August, General François launched a fierce artillery attack that crushed the last remnants of the 2nd Army's left flank. This made it possible for the general's forces to block the escape route for the rest of the 2nd Army, and throughout the day Russians surrendered in large numbers. In the centre, the Russians continued to fight, but were now almost completely surrounded by the 8th Army as their position deteriorated rapidly. Time was running out for Samsonov – if the general couldn't successfully break through with the XV Corps, he'd be forced to surrender.

GENERAL SHOT HIMSELF

Meanwhile, to the north, Rennenkampf remained unaware of his countryman's problems. Orders from the time show that he was considering a large-scale encirclement of Königsberg, where he thought that the bulk of the German forces were. Once again, Russian communications and reconnaissance proved remarkably misinformed. The Germans intercepted more radio messages from Rennenkampf, all sent uncoded. These convinced the Germans that Rennenkampf wasn't coming to Samsonov's aid. Hindenburg's troops could crush the remnants of Samsonov's forces without fear of being attacked from behind by Rennenkampf's 1st Army.

On 30th August, the 2nd Army scattered. Samsonov had also fled with a small number of soldiers. The group hid in a forest during the day before trying – at night, and almost blind – to find a way back across the border. They were forced to hold hands so as not to lose each other in the pitch-black forest. At dawn on 31st August, when the group was ready to continue their march, Samsonov was nowhere to be found. Shortly after, the men heard a single shot. A quick search was launched, but without success.

If the Russians had entertained the notion that Samsonov had escaped the Germans, that glimmer of hope was quickly crushed. A German patrol found the defeated general's body and was able to quickly identify it by a special medal. There was a single gunshot wound – exhausted and unwilling to report the disaster to Tsar Nicholas II, Samsonov had committed suicide.

Small groups of scattered Russians continued to hold out until the evening of 31st August, when the north-western forces' commander, General Zhilinskiy, finally realised that the battle had been lost from his remote base at Volkovysk in modern-day Belarus. Zhilinskiy ordered all Russian troops who hadn't been surrounded to retreat to the east.

40,000
Russians were taken prisoner during the Battle of the Masurian Lakes.

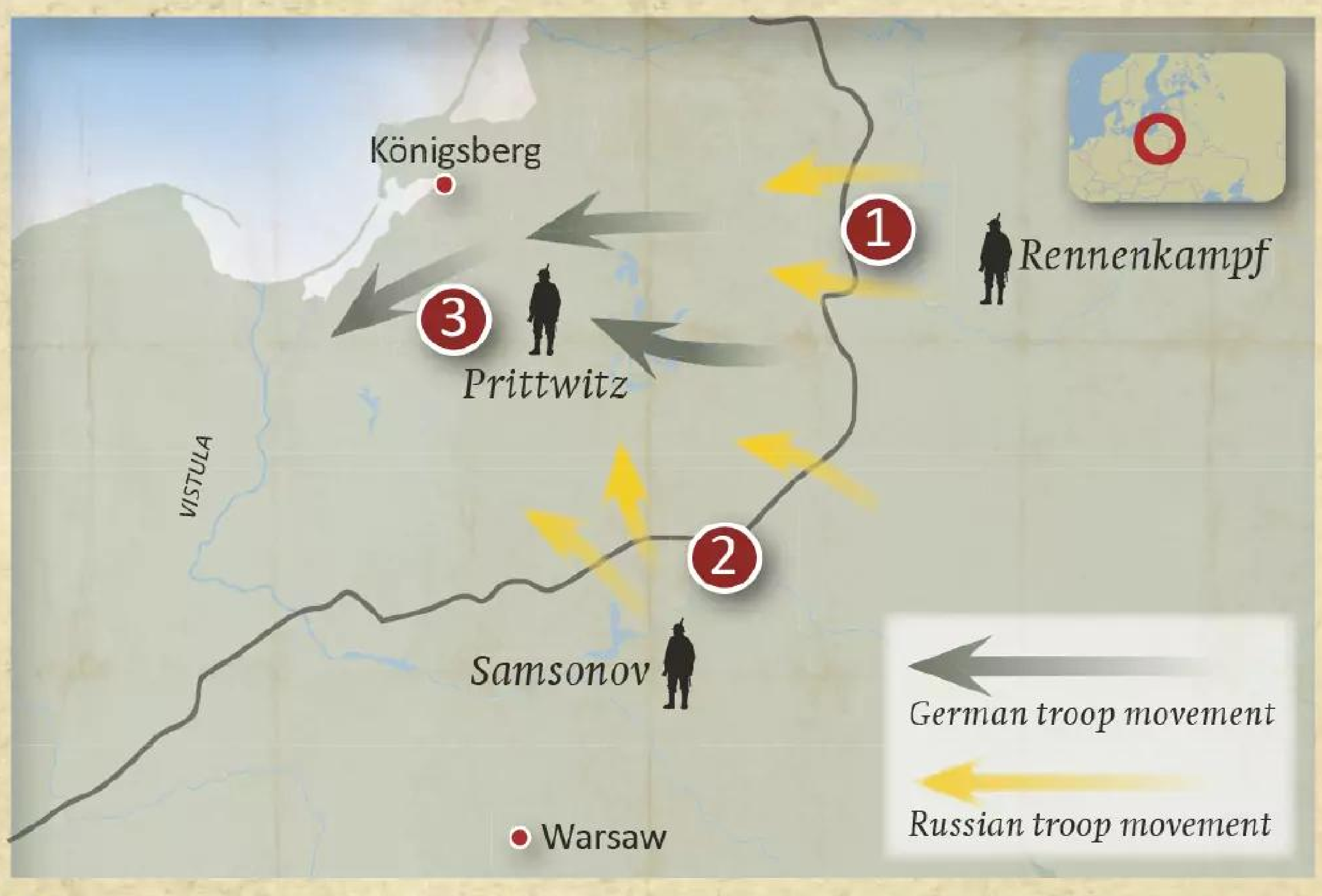
RENNENKAMPF FLED HOME

Germany's victory in the Battle of Tannenberg was perhaps the most decisive outcome in a battle throughout World War I. In all, the Germans took 95,000 Russian soldiers prisoner and injured or killed some 30,000 more. The Germans lost less than 20,000 men and in addition to capturing prisoners, took around 500 guns. It took 60 trains to transport the captured armaments to Germany.

Despite the crushing victory over Samsonov's 2nd Army, there was still the matter of Rennenkampf's 1st Army. The

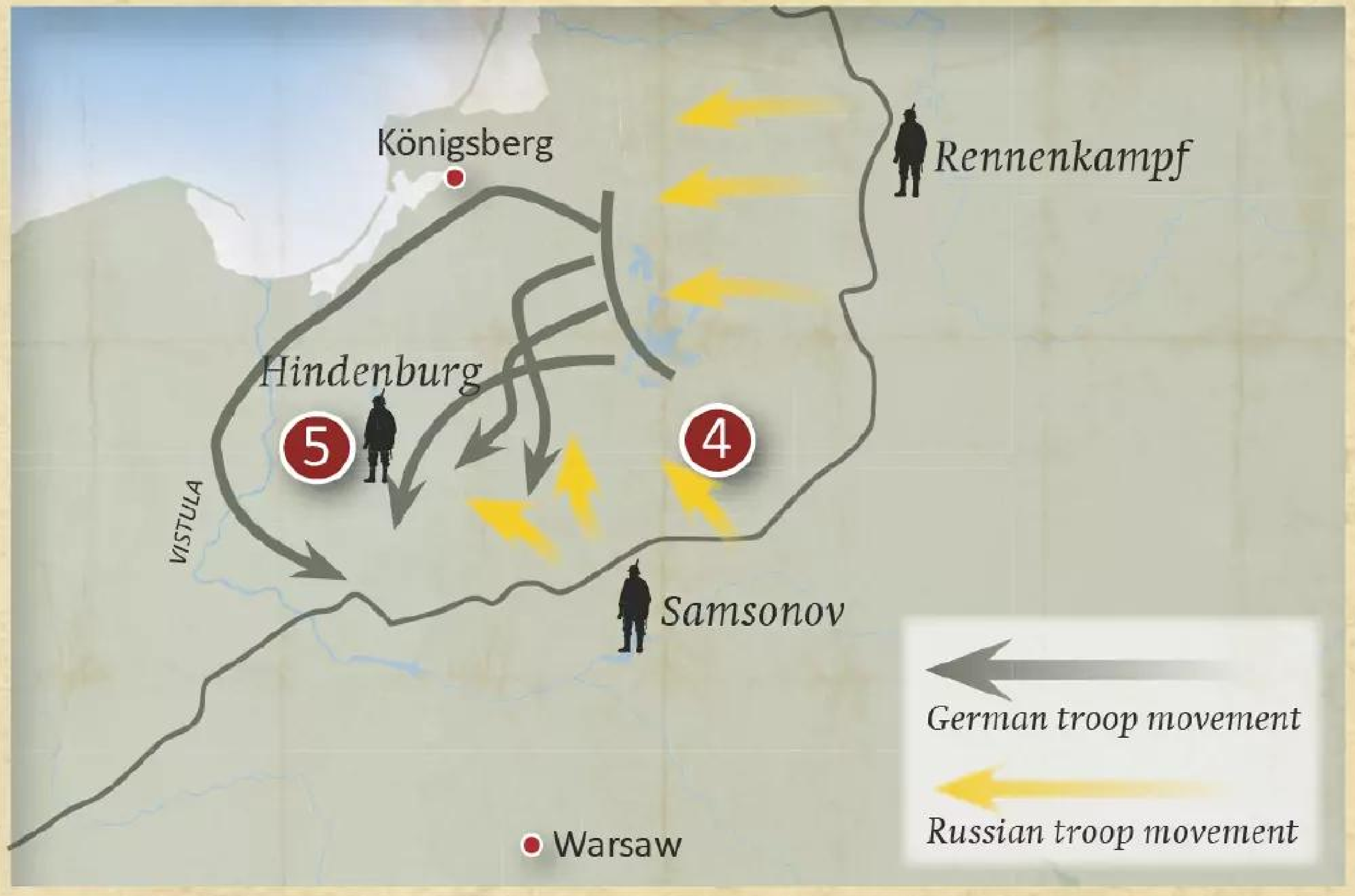
HINDENBURG EXPELLED THE RUSSIANS FROM EAST PRUSSIA

1: RUSSIANS ADVANCE INTO EAST PRUSSIA



① 17th-20th August: Russian General Paul von Rennenkampf and the 1st Army enters East Prussia. Minor skirmishes. ② 21 August: Russia's 2nd Army under General Alexander Samsonov crosses the border. ③ Afraid of being surrounded by the numerically superior Russians, German general Maximilian von Prittwitz decides to withdraw his 8th Army back to the Vistula River.

2: GERMANS LAUNCH COUNTEROFFENSIVE



④ 21st-26th August: Russian forces are slowly advancing further into East Prussia. ⑤ Paul von Hindenburg takes over command from Prittwitz and instantly switches tactics from retreat to attack. The majority of the 8th Army moves south to confront Samsonov's 2nd Army, while cavalry troops remain to shield against Rennenkampf in the north.

Germans marched through East Prussia's devastated towns in search of Russians.

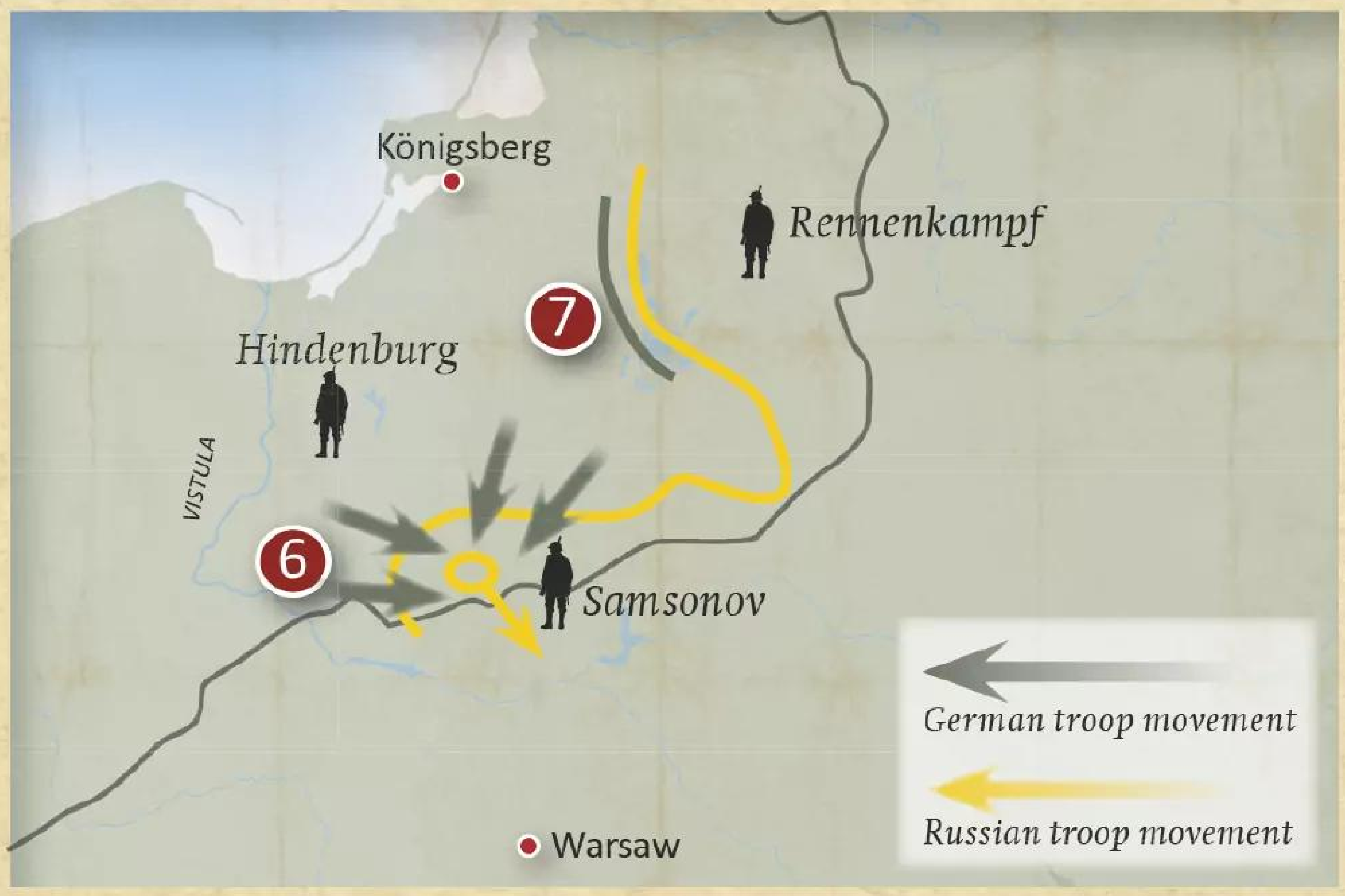
order from Berlin was clear: Rennenkampf's troops must also be obliterated. On 2nd September, Hindenburg and Ludendorff began deploying their troops forward to meet Rennenkampf's forces. Thanks to the reinforcements from the Western Front, the Germans had – for the first time during these battles – superior numbers.

The ensuing battle was known as the Battle of the Masurian Lakes, named after the area in present-day north-eastern Poland where the fighting took place. The terrain's many lakes made troop movements difficult, but on 8th September, the Germans advanced and prepared to face the Russians. Hindenburg's troops were able to quickly crush the Russians in the north, forcing them back, but in the south the Russians' II Corps provided fierce opposition and were even close to encircling General August von Mackensen's XVII Corps. Any hopes of a Russian victory vanished, however, when the German I Corps arrived to help the XVII. The Russians were now being pushed back across the entire front.

By 11th September, Rennenkampf's troops had been forced back towards the Russian border and the general feared being surrounded by the Germans. He finally ordered a quick retreat and barely escaped his troops being wiped out completely. To the Russian army's great luck, the Germans lost half a day's march after hearing false rumours about a Russian counterattack.

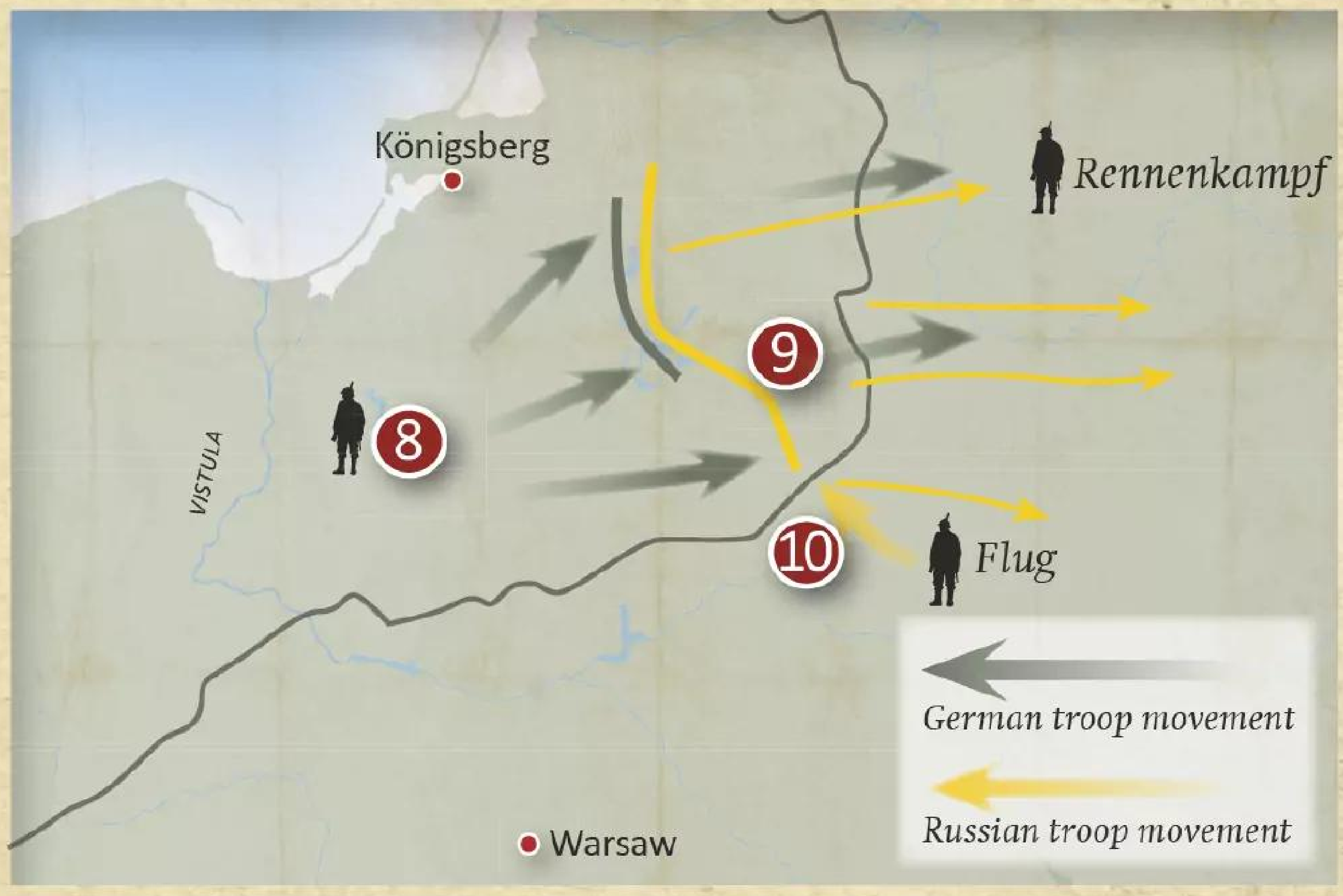
Although the Russian defeat at the Battle of the Masurian Lakes wasn't as great as at the Battle of Tannenberg, the fighting was hard on the Russian 1st Army.

3: GERMANS WIPE OUT SAMSONOV'S FORCES



⑥ 26th-30th August: the bulk of the German 8th Army attacks, encircles and virtually obliterates Samsonov's 2nd Army. The surviving Russians flee back towards the border. ⑦ Meanwhile, the German cavalry continues to block Rennenkampf from advancing. Russia's bad communication lines mean that Rennenkampf knows nothing about Samsonov's problems further south.

4: GERMANS SEND RENNENKAMPF ON THE RUN



⑧ 1st-8th September: the 8th Army starts hunting Rennenkampf's 1st Army and advances towards the Masurian Lakes. The Germans receive reinforcements to gain numerical superiority. ⑨ 9th-14th September: at the Battle of the Masurian Lakes, the Germans drive the Russian 1st Army out of East Prussia. ⑩ Russian general Flug's 10th Army counterattacks but is soon turned back.

In the East Prussian city of Allenstein, authorities distributed aid to civilians who were forced to flee from advancing Russians when fighting began.

Hundreds of Russian cannons were left in German territory when the invasion ended after three weeks with the Russians turning tail and fleeing for home.

125,000 soldiers were killed, wounded or taken prisoner according to the Russians' own figures.

After victory in East Prussia, Hindenburg and Ludendorff were hailed as heroes throughout Germany, and in 1916 Hindenburg was appointed Chief of Staff for all German troops. Ludendorff accompanied him and became the old general's deputy under the condition that all orders were issued jointly.

THE WAR RAGED ON

Germany's crushing victory shocked Russia's allies, who wondered if it meant a final defeat for the Russian Army. That wasn't the case – the Russians had suffered a painful and humiliating defeat, but as always, its vast size and almost inexhaustible reserves of men capable of fighting ensured the army's survival. The war on the Eastern Front could therefore continue, and the Germans were still caught up in a war on two fronts.

In late 1914 the Russians launched a number of successful attacks against Austro-Hungarian forces and captured almost all of Galicia, which today is divided between Poland and Ukraine. In early 1915, the Russians progressed further until German reinforcements arrived to help halt the advance.

At this point, the Germans made victory on the Eastern Front their primary objective, and the army leadership sent more reinforcements east. The campaign began in May 1915 with an offensive in Galicia, and the Germans soon forced the Russians back. The Russian army suffered from a lack of equipment, artillery and ammunition, but were still able to halt the German march in late 1915 along a line from Riga in the north to Ternopil (eastern Ukraine) in the south.

> "After victory in East Prussia, Hindenburg and Ludendorff were hailed as heroes throughout Germany"

Further south, Germany's main ally Austria-Hungary enjoyed initial success. In the autumn of 1915, the empire's troops finally managed to take Serbia with German help after several failed attempts, and Austrian soldiers were also helped to take part of Romania the following year. In the Alps, the Austro-Hungarians were even able to keep the numerically superior Italian forces at bay.

Gradually, however, the great empire ran into problems. While Allied reinforcements flocked to the Italian forces in the south, Russian general Aleksei Brusilov launched an offensive on Austria-Hungary's Eastern Front in the summer of 1916, which in just three days had made 200,000 Austro-Hungarian soldiers prisoners of war. Once again, the Germans had to divert yet more troops from the Western Front to ride the rescue of their increasingly incapacitated ally.

RUSSIA COLLAPSED

Despite Brusilov's victory, the war took a great toll, and by 1917 the economy in the Tsarist empire was on the brink of collapse. Food shortages in many cities led to civil unrest, while huge casualties on the Front made large parts of the army mutinous. The situation became increasingly tense until the angry citizens of Petrograd (now St Petersburg) overthrew Tsar Nicholas II in the February Revolution, and an interim government took his place. In October, the Bolsheviks seized power from the government under the leadership of Vladimir Ilyich Lenin. Eager to consolidate his power over a country heading into civil war, Lenin supported Germany's exorbitant demands that the Russians cede large areas of land in return for peace. The Treaty of Brest-Litovsk of 3rd March, 1918 saw the Russians give up Finland, Estonia, Latvia, Lithuania, Ukraine, Russian Poland, western Belarus and parts of the Caucasus region.

After more than three million deaths and nine million casualties, the war on the Eastern Front ended with victory for Germany. The troops could now be transferred to the Western Front, where they were badly needed. ■

ERICH LUDENDORFF *1865-1937*

FATHER OF THE "TOTAL WAR" THEORY

■ German general Erich Ludendorff prevailed at both Liege and Tannenberg before he and General Paul von Hindenburg took joint command of the entire German war effort. After the war, Ludendorff became a prominent advocate of the "Stab-in-the-back" myth, the theory that German soldiers hadn't lost on the battlefield but had been betrayed by Marxists and Republicans with the Treaty of Versailles. Ludendorff took part in both Wolfgang Kapp's failed coup attempt in 1920 and the Beer Hall Putsch in Munich in 1923, which was led by Adolf Hitler. In 1925 he ran unsuccessfully as the Nazi presidential candidate against Hindenburg. Later he published his theory of total war under the title *The Total War* in 1935. In the book Ludendorff argued that the whole nation's physical and moral forces must be mobilised for war. According to Ludendorff, peace was merely the gap between wars.

War theorist – Led German troops to victory – Became Nazi after the war

GERMANS PREVAILED ON THE EASTERN FRONT

While the deadlocked Western Front quickly developed into a gigantic slaughterhouse, the war went much better for the Kaiser and his allies on the Eastern Front – although Austro-Hungarian forces disappointed in the fight against the Russians.

🟦 *Biggest advance for Russia and its allies during the war.*

🟥 *Biggest advance for Germany and its allies during the war.*

RUSSIA'S FEW VICTORIES

■ *While the Germans defeated the ill-equipped and poorly led Russian Army in the north, things went a little better for the Russians in Galicia. The Brusilov Offensive in June 1916 became Russia's greatest success, and included an attack on the city of Lutsk in north-western Ukraine. Fierce artillery fire by the Russians led to the city's 200,000 Austro-Hungarian defenders fleeing in panic, and thousands were captured.*

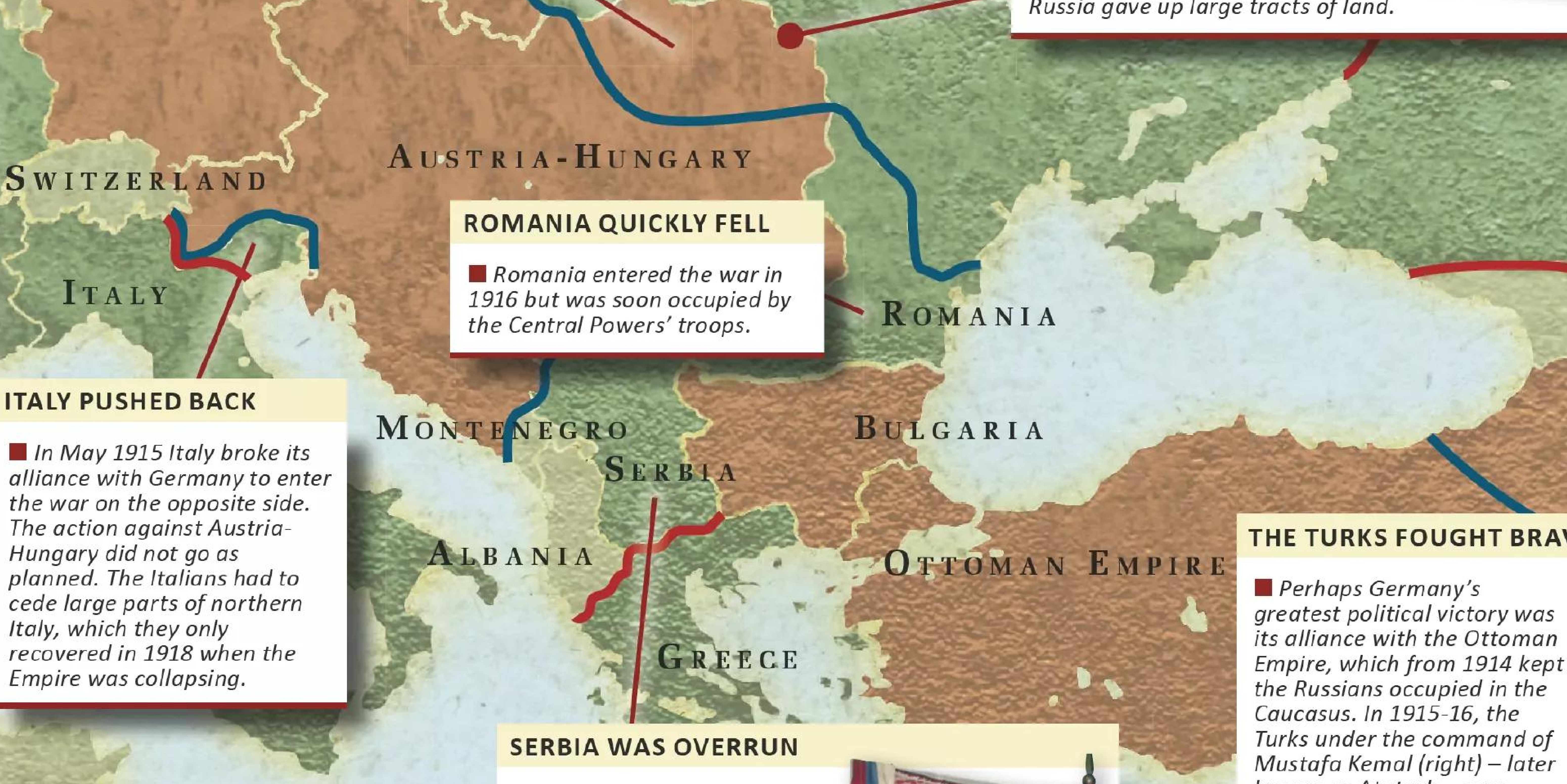
GERMANY DOMINATED IN THE NORTH

■ *After Tannenberg, fighting swung back and forth, usually with Germany the victors. In March 1916, for example, 1.5 million Russians attacked one million Germans and Austro-Hungarians at Lake Naroch in modern-day Belarus. The Russians advanced after an intense artillery bombardment, but the shelling had been inaccurate and ploughed the spring-damp ground up, so the Russians were caught in the mud as easy targets for German machine guns.*

German general August von Mackensen led the 8th Army's XVII Corps at Tannenberg.

TREATY OF BREST-LITOVSK CONCLUDED VICTORY

■ *The war on the Eastern Front was expensive for the Russians, and highly unpopular among the population. In February 1917 the Russians overthrew the Tsar. A provisional government continued the war, but in October the Bolsheviks took power and began negotiations with the Germans in the town of Brest-Litovsk. Lenin signed a peace treaty whereby Russia gave up large tracts of land.*



ROMANIA QUICKLY FELL

■ *Romania entered the war in 1916 but was soon occupied by the Central Powers' troops.*

ITALY PUSHED BACK

■ *In May 1915 Italy broke its alliance with Germany to enter the war on the opposite side. The action against Austria-Hungary did not go as planned. The Italians had to cede large parts of northern Italy, which they only recovered in 1918 when the Empire was collapsing.*

SERBIA WAS OVERRUN

■ *Serbia withstood an invasion attempt by Austria-Hungary in 1914. But in autumn 1915 soldiers from Germany, Austria-Hungary and Bulgaria poured into Serbia and occupied the country. Only in autumn 1918 were Serbian and French forces able to liberate the country.*

С ВЕРОМ У БОГА

THE TURKS FOUGHT BRAVELY

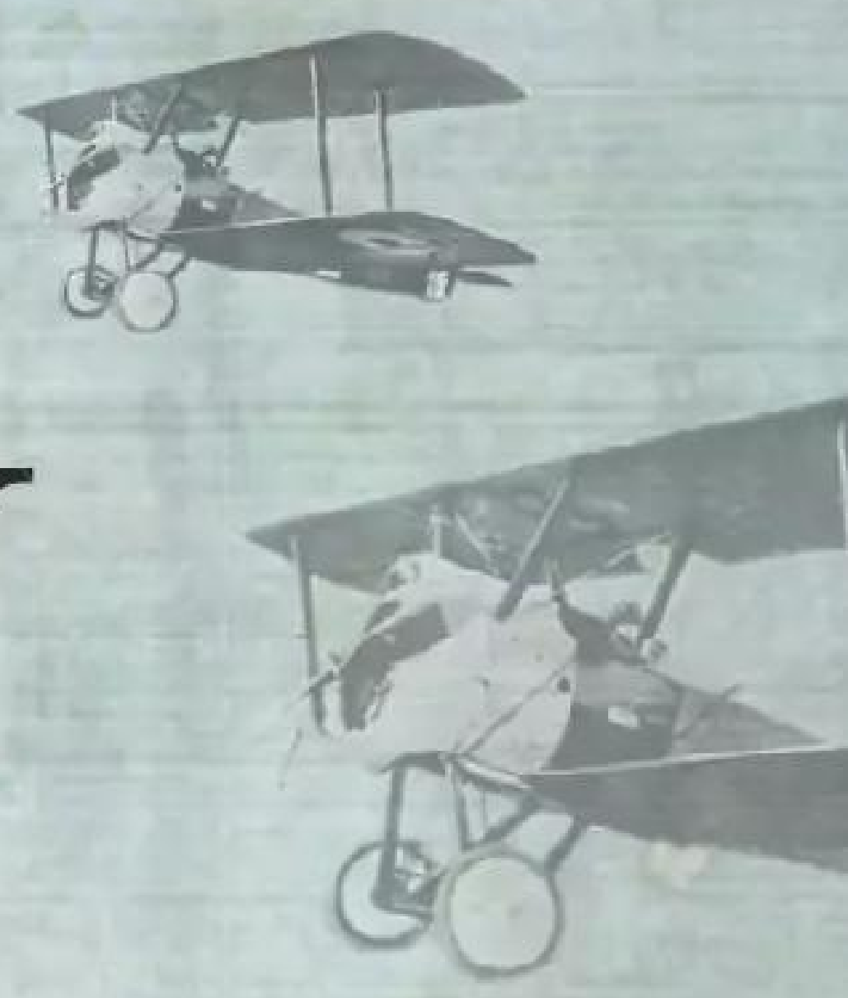
■ *Perhaps Germany's greatest political victory was its alliance with the Ottoman Empire, which from 1914 kept the Russians occupied in the Caucasus. In 1915-16, the Turks under the command of Mustafa Kemal (right) – later known as Ataturk – even withstood a Franco-British attempt to capture the Gallipoli peninsula.*

🟩 *Entente Powers (countries allied with Russia)*

🟫 *Central Powers (countries allied with Germany)*

0 1,000 km

674



WAR IN A TIN CAN

1915-1918

On an early autumn morning in 1916, 32 steel boxes bumped forward over the northern French battlefield to the great horror of the German soldiers who had never seen anything like it before. It was at least as daunting an experience for the tank crews too. They had to try to orient themselves in the smoke, steam and unbearable heat, while crawling at less than six kilometres an hour toward the German lines in their highly sensitive metal crates. The tank had made its entrance on the battlefield.

1915-18

1915: "The Landships Committee" is set up to develop what later become tanks.

1915: the first British prototype is ready.

1916: the first tank is inserted into the Somme offensive.

1917: British score the world's first large tank success at Cambrai with a breakthrough of German lines.

1918: Germany's first tank, the A7V, is ready.

1918: the world's first tank battle takes place on the Western Front.

1915 1916 1917 1918

From the first battle of Ypres in 1914, trench warfare on the Western Front was locked in an unyielding stalemate. Strafe, barbed wire and artillery fire meant that it required incredible sacrifices to climb the grenade-devastated no-man's land between the fronts.

But on 15th September, 1916 the situation would change – or so the British hoped. That day British generals sent their new secret weapon into battle for the first time. 32 heavily armoured, gun-equipped tanks rumbled out over the battlefield during the Battle of Flers-Courcelette, a part of the Somme offensive.

Of the 32 tanks five refused to start, while nine broke down, and nine others were too slow to keep up with the infantry. But the last nine tanks reached the German lines where they spread terror and destruction exactly as planned. The noisy metal boxes were unstoppable, ploughing on their tracks through mud, barbed wire and shell holes, and the sight of them frightened the life out of the enemy.

"One stared as if one had lost the power of one's limbs", said a German newspaper reporter who witnessed their first appearance. "The monsters approached slowly – hobbling, rolling, rocking, but always advancing. Some shouted 'the devil is coming', and the word passed along the line".

Another German soldier told how the bravest soldiers climbed out of the trenches to throw grenades on the roof of the tanks or to shoot or stab with bayonets through the small cracks that tank crews used as peepholes. But they were shot down or crushed, while others threw up their hands in horror, surrendered or hurried down the communication trenches towards the rear lines.

CHURCHILL BELIEVED IN LANDSHIPS

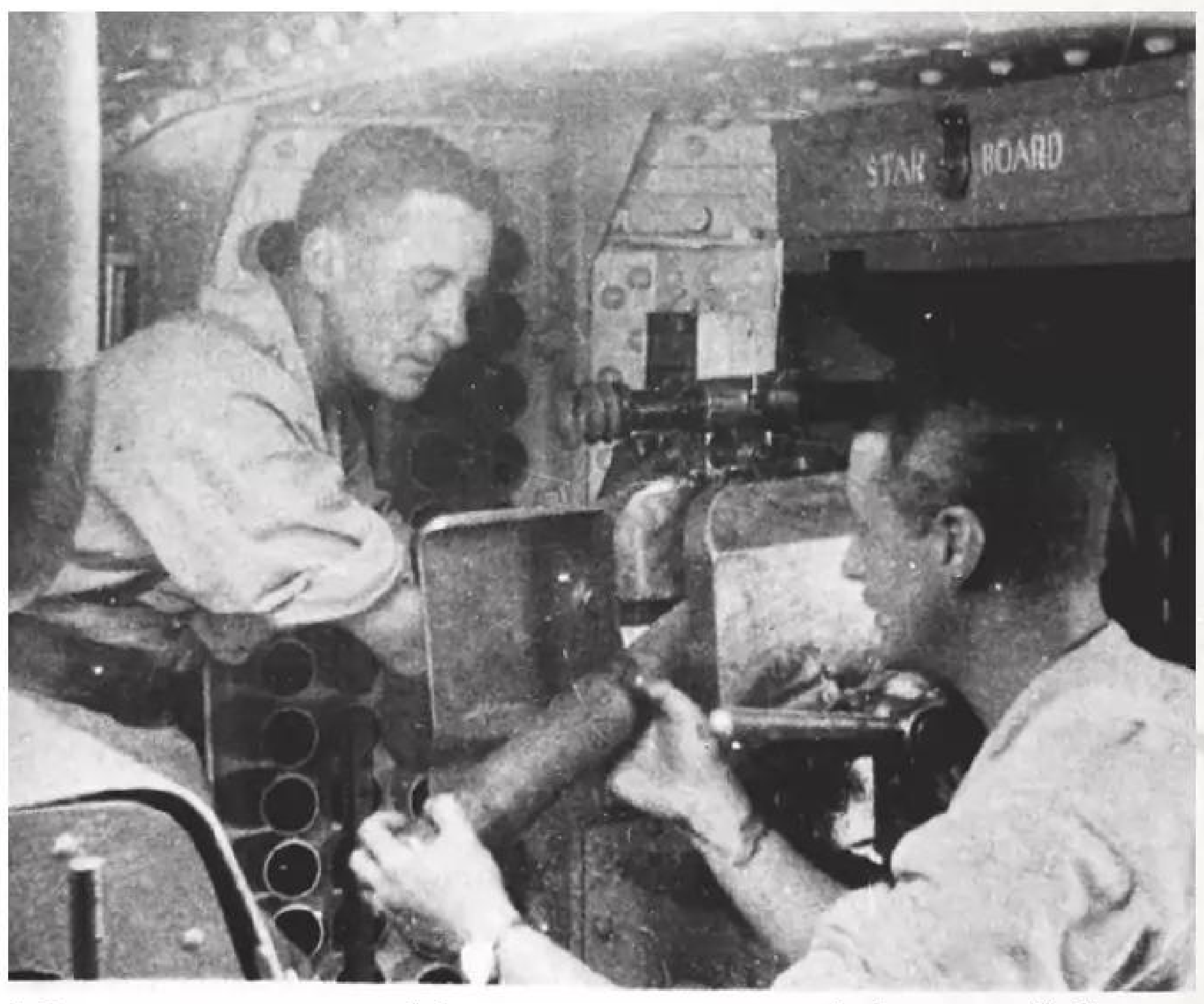
The first witnesses to see a tank in the war thought that they faced an invincible weapon. No fighting machine had yet been able to climb the no man's land between the trench lines and attack the enemy while its crew was protected from machine gun bullets and the worst effects of artillery fire.

Although it was not satisfactory that only nine tanks of the original 32 performed as planned, the effect on the Allied soldiers' morale was invaluable after the first tank attack. For the first time, soldiers felt that it was possible to end the trench warfare stalemate.

Pigeons were on board some British tanks to send messages home to headquarters.

The reality was somewhat different inside the tanks. The first models were unsafe, inconvenient and unreliable monstrosities that were almost as dangerous to the occupants as the enemy. To operate inside a tank was full of hazards and those soldiers who clambered aboard were risking their lives daily.

In the beginning, Army Command was not in favour of the new fighting machine: The army simply refused to have anything to do with the project when it was first proposed in late 1914. But a certain Winston Churchill, who at the time worked for the Admiralty, was more positive. He arranged financing and in February 1915 created "The Landships Committee" to manage the project. Landship was the first name for the tank, but to hide the project's goal from the Germans, the British began to call its new war machine the "tank".



Men sat squeezed between ammunition and the mechanics of their cramped tanks, while the temperature climbed to 50 degrees.

THE PROTOTYPE GOT STUCK

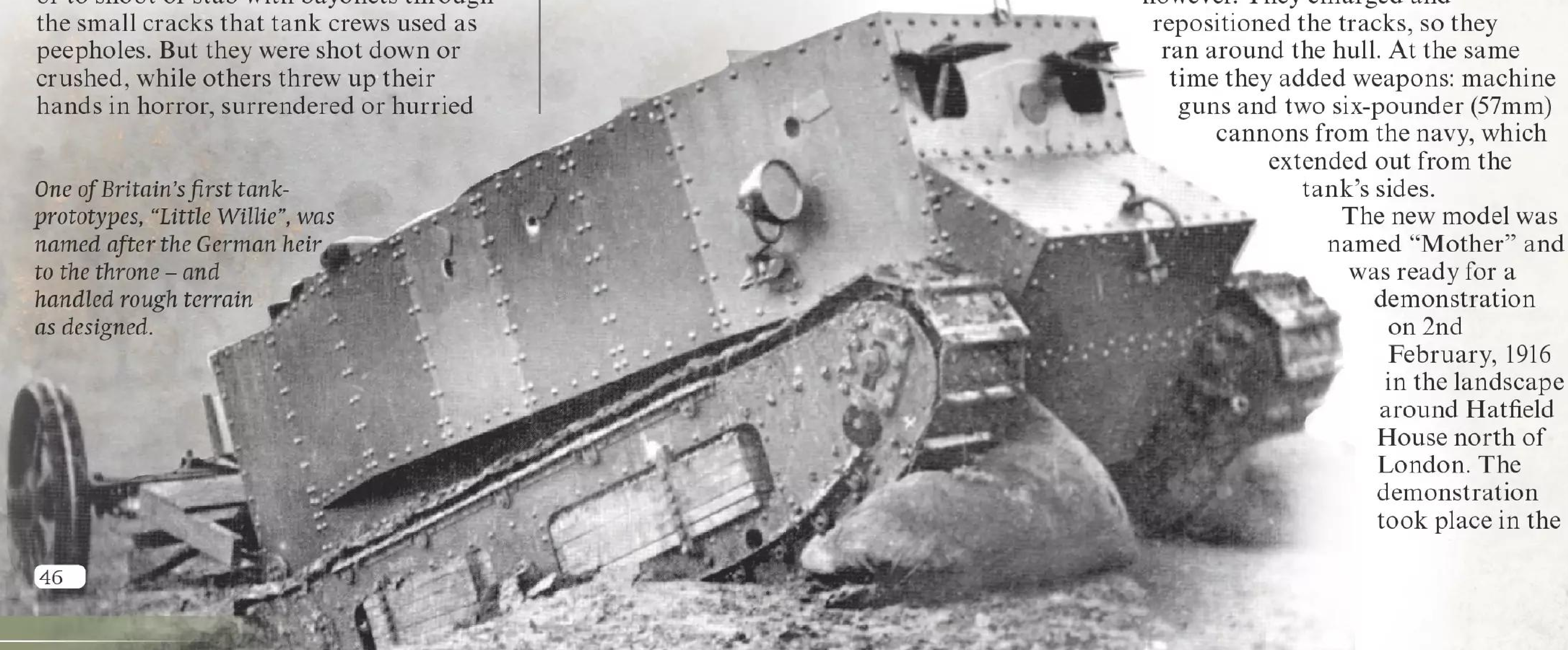
Two men led the development of the new landship: William Tritton, director of tractor manufacturer William Foster & Co, and Lieutenant Walter Gordon Wilson from the navy who, before the war, had worked on designing cars.

The two tank pioneers set a number of requirements: the new war machine should be able to run at least six kilometres per hour, climb 1.5-metre-high soil mounds and traverse holes up to 2.5 metres deep. In short, it should be able to cope with trenches and the front's bomb-pitted terrain.

By 9th September, 1915 Tritton and Wilson were ready with the first prototype, called "Lincoln Machine Number One" or "Little Willie". It was a metal box with caterpillar tracks powered by a tractor engine, and the first test run in the yard at William Foster & Co yielded mixed results. The tracks broke free in an instant, so the tonne tank became stuck in the holes and trenches. At the same time it was top-heavy and therefore unstable.

Tritton and Wilson solved both problems over the following months, however. They enlarged and repositioned the tracks, so they ran around the hull. At the same time they added weapons: machine guns and two six-pounder (57mm) cannons from the navy, which extended out from the tank's sides.

The new model was named "Mother" and was ready for a demonstration on 2nd February, 1916 in the landscape around Hatfield House north of London. The demonstration took place in the



One of Britain's first tank-prototypes, "Little Willie", was named after the German heir to the throne – and handled rough terrain as designed.

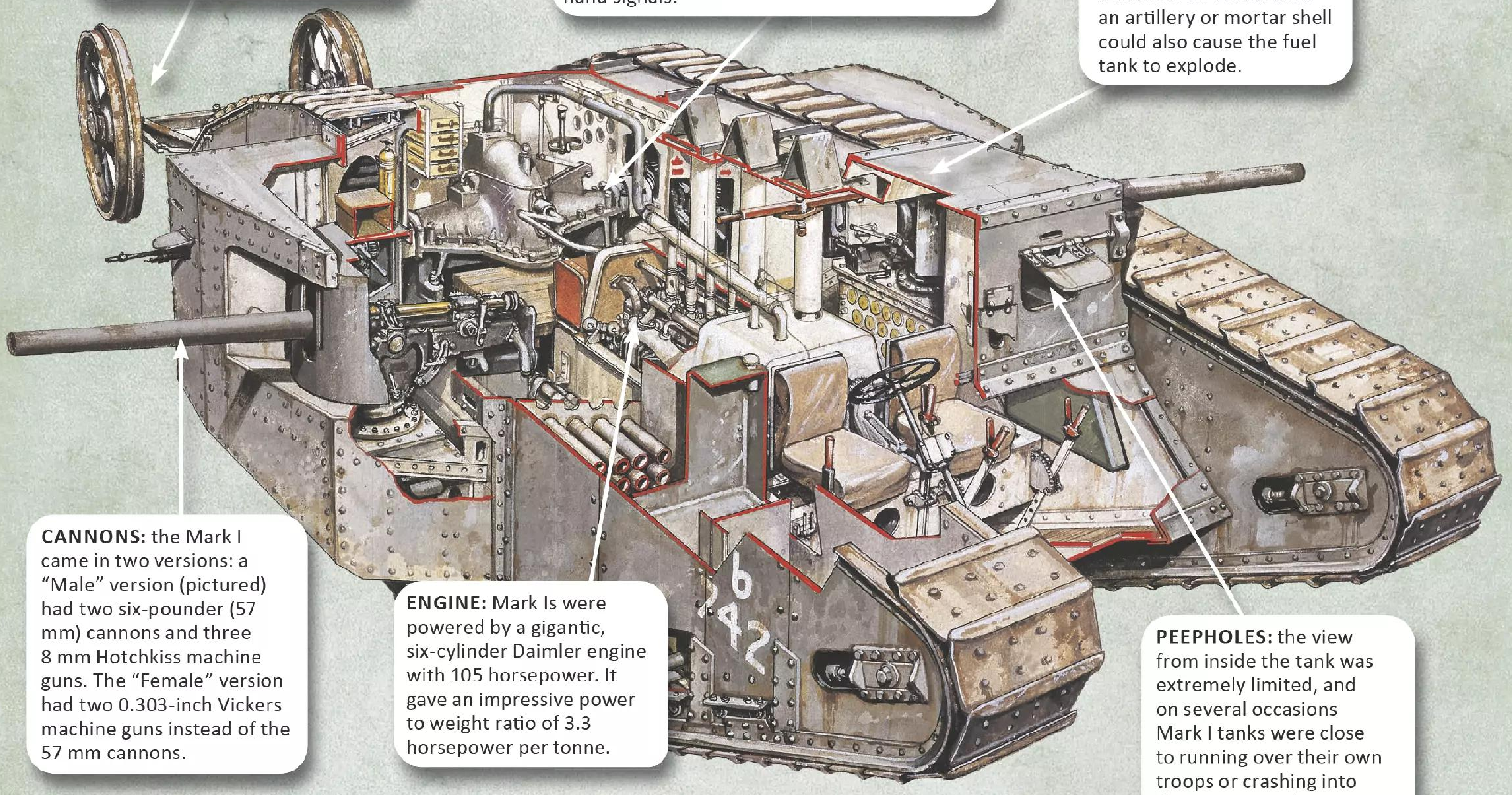
SLOW COLOSSUS ON TRACKS

The world's first tank, the British Mark I, was developed as an attempt to break the deadlock of trench warfare. But it was too heavy, slow and difficult to manoeuvre to make any decisive impact.

STEERING WHEELS: the Mark I had a steering wheel at the back to help change direction. It seemed unnecessary and was dropped in later versions. Instead drivers controlled the tank by varying the speed of the two caterpillar tracks.

CABIN: the Mark I's cramped interior contained eight men, four gunners, two gears men and two drivers, one of whom was tank commander with control of the brakes. The noise was so loud that the men had to catch each other's attention by knocking a heavy wrench on the engine block or hull and then communicate via hand signals.

ARMOUR: the armour was between six and 12 mm thick and protected the crew against machine gun fire, but not against special armour-piercing bullets. A direct hit with an artillery or mortar shell could also cause the fuel tank to explode.



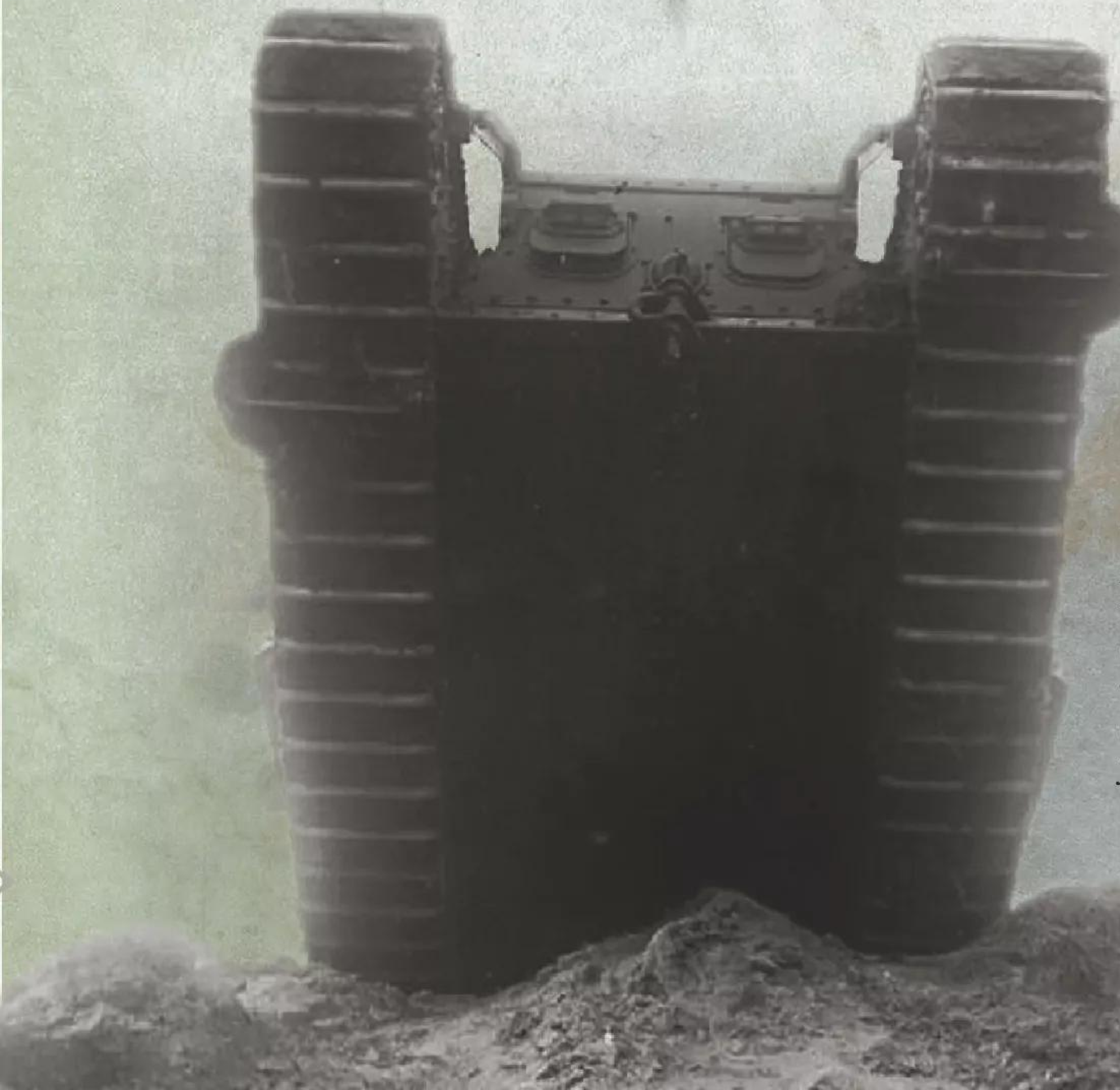
CANNONS: the Mark I came in two versions: a "Male" version (pictured) had two six-pounder (57 mm) cannons and three 8 mm Hotchkiss machine guns. The "Female" version had two 0.303-inch Vickers machine guns instead of the 57 mm cannons.

ENGINE: Mark Is were powered by a gigantic, six-cylinder Daimler engine with 105 horsepower. It gave an impressive power to weight ratio of 3.3 horsepower per tonne.

PEEPHOLES: the view from inside the tank was extremely limited, and on several occasions Mark I tanks were close to running over their own troops or crashing into their own trenches.

MARK I TANK

Length	9.9 m
Width	4.1 m
Height	2.43 m
Weight	28.4 tonnes
Top speed	5.95 km/t
Engine output	105 hp
Operating radius	37.9 km
Fuel consumption	5.8 l/km



The sight of a Mark I tank from the bottom of a German trench was so scary that German soldiers fled in panic.

greatest secrecy, and in the stands were future Prime Minister David Lloyd George and Secretary of State for War Lord Kitchener. Mother ploughed through swampy land and over the holes and trenches to pass all tests. But several in the War Office remained sceptical, and Kitchener condescendingly referred to Mother as “a mechanical toy”.

People around Kitchener later stated that the minister was simply challenging the design team to defend their creation – because he was curious to hear their response. Whatever the truth, the government had already ordered 100 tanks by 12th February, which was soon followed by an order for 50 more. Production of the Mark I, as the finished version was named, could begin.

TANKS WADED IN WITHOUT TACTICAL DIRECTION

Although the British tank’s entrance on the battlefield of the Somme was a partial success, the tank was far from being a fully developed and proven weapon.

Initially Army Command had no concept of how the new “landships” could best be used, and when tank forces were subsequently inserted in the battles of Arras, Bullecourt, Messines and Passchendaele, it happened without special tactical forethought. The landships were there but no one really knew what to do with them, placing the tank crews in avoidable, vulnerable and extremely dangerous situations.

“It was unfortunate that the decision to send the tanks rested with officers in high places”, lamented tank commander JC Allnatt in connection with the Battle of Messines at Ypres Ridge in 1917.

“If the officers had been to see the salient, and if they had the brains of a child, they surely would never have committed the tank crews to practically certain death”.

The tanks were inserted in too small a number to really make any difference and often in places where the terrain gave them great trouble moving forward. The problems were summarised even more robustly by Lieutenant Norman Dillon:

“There was no tank strategy, when I joined. The only strategy was to climb into the tank and head towards the enemy. With luck the infantry followed afterwards”.

> “His body slithering on to the floor and leaving a smear of blood on the engine cover”

EYEWITNESS

Machine gunner Alfred Simpson /
Aftermath of a bombed tank

ONLY LEGS REMAINED IN THE BURNED-OUT TANKS

> “We would get the sponson door open, and there would be several pairs of legs... Just legs... Perhaps the fire had been more intense from the waist height or something... But it was the same in every tank. Just legs...”

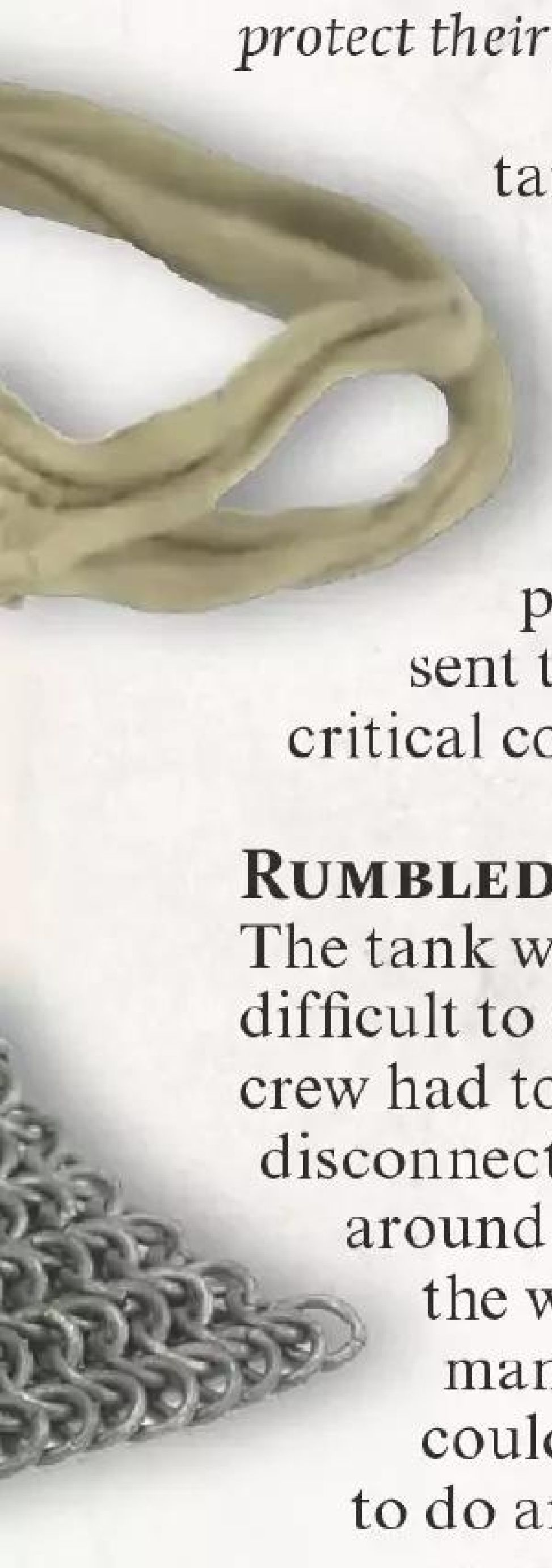
TANK CREWS WERE SICK FROM FUMES

The lack of overall concern was extra stressful because crews already had plenty to occupy them. Their comfort had not really been a top priority in Tritton and Wilson’s design process. Every Mark I tank was manned by a commander, a driver, two gear men and four men to operate the many weapons. The entire eight-man crew had to cower in the tank’s cramped cabin, where they even had to share the limited space with the engine – a huge, six-cylinder, 105-horsepower Daimler. The exhaust smoke was passed through a tube out through a hole in the roof, and the tube was so hot that the crew could hold a can of water up against it when they wanted to make tea. The heat given off by the engine meant the temperature in the cabin could be rise to 50 degrees, and it made a noise so loud that the crew could only use sign language to communicate – such as one finger for first gear and two for the second.

In addition to engine and crew in the tank’s claustrophobic interior there were also two gas masks per man and 334 grenades while the gunners could neither stand up nor sit down. Instead they had to stand bent over the gun and try to aim through a small pinhole. While driving, it could however be more than difficult to focus on anything outside of the tank. Despite the modest top speed of just 6 km/h even the slightest unevenness sent tremors throughout the tank that did not have any suspension. The tracks could also fall off, and when it happened, the crew was thrown around like clothes in a dryer around the scorching hot machine.

Finally, the engine was so poorly insulated that the air in the cabin was full of petrol gasses, making it very dangerous for the crew. A study from August 1918 estimated that with good weather and ground conditions, a well-functioning engine and medium to heavy fighting a crew could expect to fight for 12 hours. Bad circumstances, however, could change this hopeful figure; the report stated, providing a typical example: “Some crews were physically ill after two hours fighting. These

Tanks were used on the battlefield to support advancing infantry attempting to break through enemy lines.



When enemy bullets hit the tank's armour the metal melted and flung dangerous splinters into the cabin. As a result, tank drivers wore masks to protect their face.

tanks had done a bit of running and it had been impossible to overhaul the engines. Consequently the exhaust had warped and joints became loose and the tank was full of petrol fumes. Three men were sent to hospital, one of them in critical condition".

Rumbled over bodies

The tank was extremely demanding and difficult to control. For larger turns the crew had to stop the tank completely and disconnect one chain while the tank drove around on the other to turn the hull. On the whole, the tank wasn't that manoeuvrable, and it meant that it could be take a lot of time and effort to do any more than was absolutely necessary. Second Lieutenant Vic Huffam revealed the grim consequences of this. After the first tank attack on the Somme he drove his tank down the main street in the town of Flers, which following heavy fighting had been reduced to a chaotic mess of brick and bodies. Huffam tried first to clear a route through the dead bodies, but again and again had to return to the tank due to enemy fire. Eventually he had to give up and ordered his driver to continue.

"He was pretty sickened when I gave the order to advance over these bodies, but there was not much else we could do".

Another tank driver, Archie Richards, had the same experience:

"You couldn't pick your way through. If they fell in your way, you had to go over them. We never deviated the tanks for anything except targets".

The tanks' manoeuvrability difficulties and the crews' lack of ability to orient themselves often led to serious problems in combat situations. In the Battle of the Somme for example, a tank accidently fired on a platoon of British attack troops ready to storm the enemy – in the belief that the soldiers constituted the German frontline.

Major A Weyman, who witnessed the incident, later described how it was only possible to stop the tank because a captain named AJG Crosse rushed up and pounded desperately on the side of the visually impaired steel colossus.

"Many months passed before the 16th Infantry Brigade would have anything to do with tanks again", recounted Major Weyman.

125
horsepower engine was fitted to a British Mark IV tank.

The many problems with manoeuvrability and orientation meant that the machines were far from invincible – despite first impressions. Their shortcomings quickly became just as clear to the Germans as to the British themselves. Artillery shells had a devastating effect on the first tanks, as Captain Donald Richardson told after the Battle of Ypres, where his tank was subjected to several days of heavy bombardment. A fatal hit ricocheted throughout the cabin causing the tank to falter before the worst happened to one of the crew:

"A large, jagged splinter came violently through the gun port and took Arthurs full in the face, tearing through his lower jaw and burying itself in his chest. He fell without a sound, and slant of the tank pitched him into the engine, his body slithering on to the floor and leaving a smear of blood on the engine cover".

Tanks punched a hole in the German line

To make the tanks less vulnerable and more efficient during the war the British worked constantly to improve the design. The Mark I tank evolved over time to the Mark II, III and IV, the latter boasting better armour as the fuel tank was moved from its earlier, vulnerable location to the front.

The Mark IV still suffered from many of the same problems as the first tanks, but it was still the one that brought the British their first major tank success at the world's first real armoured battle. It took place on 20th November, 1917 near the northern

French city of Cambrai. Under cover of the fire from around 1,000 guns, 476 Mark IV tanks appeared at dawn through the smoke and mist over a front 10-kilometres wide, bound for the German fortified line of defence at the Hindenburg Line.

"Without exaggerating", wrote a German officer who saw the Germans' subsequent escape, "some of the soldiers were insane with fear".

The specially equipped tanks drove to the front moving the barbed wire fence apart with small anchors pulled behind them, clearing the way for the second wave. This punched a huge hole in the German line almost 10 km wide. The advance cost the lives of 4,000 British soldiers, but over 4,200 Germans and 100 guns were captured. For officers and soldiers who were used to measuring their progress in metres, the attack had advanced at terrific pace.

"An advance of over five miles (eight kilometres) in one day! Not bad, you know", said Private Alan Bacon, "considering that a similar penetration at the Third Battle of Ypres took three months to accomplish and cost tens of thousands of lives".

World's first tank duel

Inspired by the British success the Germans soon began to develop their own tank. The result was the A7V – an armoured colossus, weighing 30 tonnes and with a top speed of 12 km/h, twice that of the Mark I. The A7V was equipped with a 57-millimetre gun and six machine guns. It required a crew of 15 men, and its large, distinctive hull gave the German tank the nickname "the rolling fortress" among the British.

Despite its imposing exterior the A7V's construction was not very successful. Its physical characteristics weren't impressive, and the tank's high centre of gravity meant that it was unstable.

The development of A7V meant that the stage was set for history's first tank battle. It took place on 24th April, 1918 near the northern French town of Villers-Bretonneux, that German forces had taken with the support of A7V tanks. British tanks were sent to counterattack and tank driver Lieutenant F Mitchell from the British Tank Corps' 1st Battalion described how the tank soldiers suddenly heard the cry: "Look out! Jerry tanks about!"

Mitchell opened the hatch and looked out. Less than 300 metres away a German A7V tank was heading for the British, followed by infantry and two additional tanks, one on each side. The British tank and the front A7V immediately tried to position themselves to come within range of one another.

The Germans were the first to attack: two broadsides of armour-piercing bullets. A projectile from the final flurry wounded one of the British machine gunners. The British then drew back out of reach of the Germans' bullets and were lining up a shot with one the big guns when Mitchell suddenly looked down:

"Whilst we were ranging on the leading German tank, our own infantry were standing in their trenches watching the duel with tense interest, like spectators in the pit of a theatre".

Desperate for cover, Mitchell steered toward a trench, unbeknownst to him, British soldiers occupied it. Thankfully, their shouts and foul language alerted Mitchell to the approaching "predicament". The tank driver quickly called a halt: he stopped to help the gunner make a shot – because of his gas injury he could only fire with one hand and aim with his left eye as his right was too swollen to use.

> "A carefully aimed shot hit the German tank, bringing it to a standstill"

"A carefully aimed shot hit the German tank, bringing it to a standstill. Another roar and yet another white puff at the front of the tank denoted a second hit! Peering with swollen eyes through his narrow slit the elated gunner shouted words of triumph that were drowned by the roaring of the engine. Then once more with great deliberation he aimed and hit for the third time. Through a loophole I saw the tank heel over to one side and then a door opened and out ran the crew. We had knocked the monster out!"

He hit it three times, and killed five of the crew when they bailed out.

Two other A7Vs were almost in range, and Mitchell made sure that he and his crew were ready for them. But to British amazement the Germans retreated as soon as the British fired the first shot. The two remaining A7Vs had withdrawn. World history's first tank battle was over.

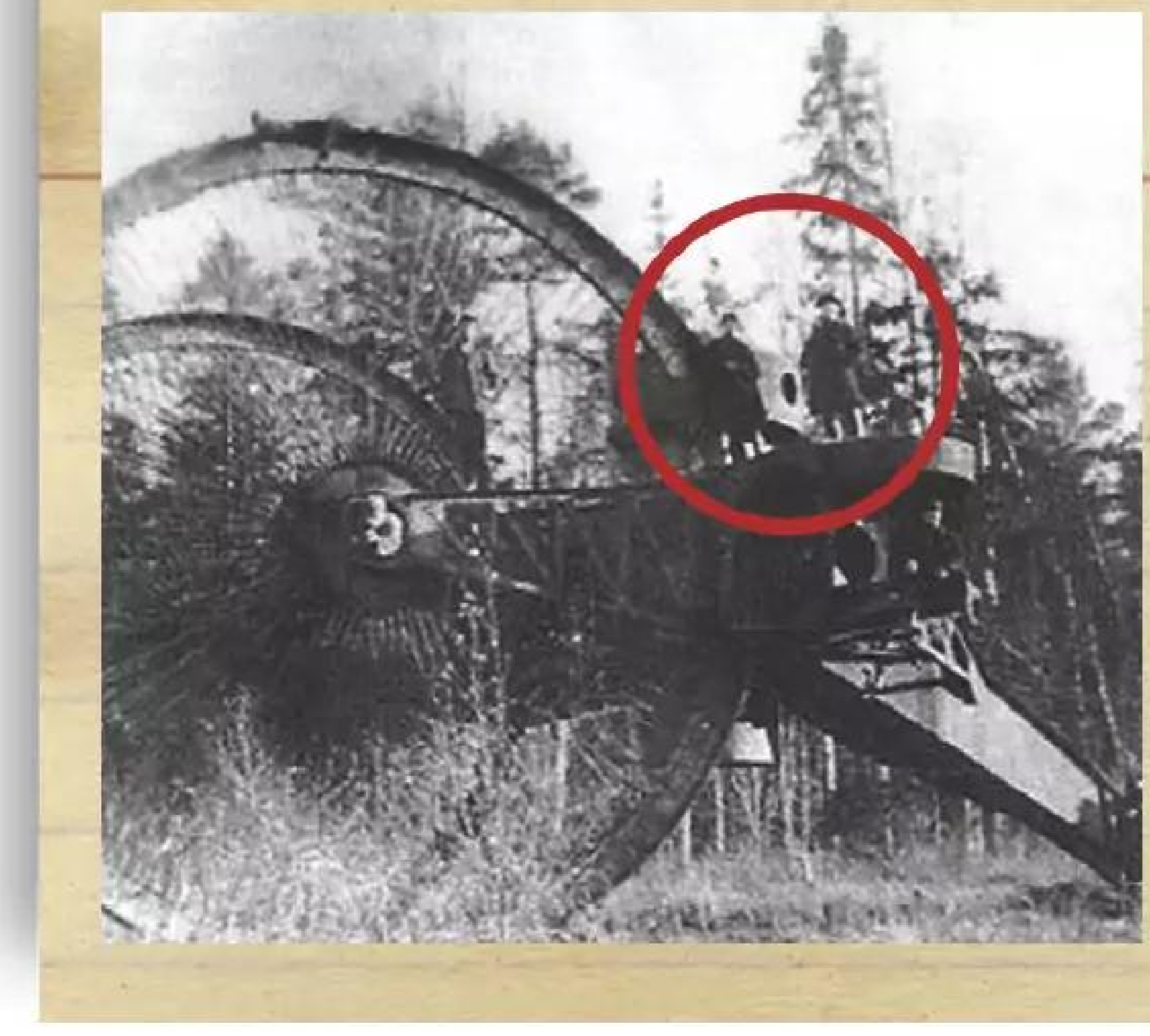
▲ *The German A7V tank was faster than the British tanks, but with its high centre of gravity made it very unstable. The steel Colossus' crew consisted of 15 men.*

The tank era could begin

Although the tanks achieved several successes during World War I, they were never the deciding factor as their inventors had hoped at their initial conception. In addition to design flaws that made them incredibly mechanically unstable and vulnerable, there were not enough of them to make any real impact.

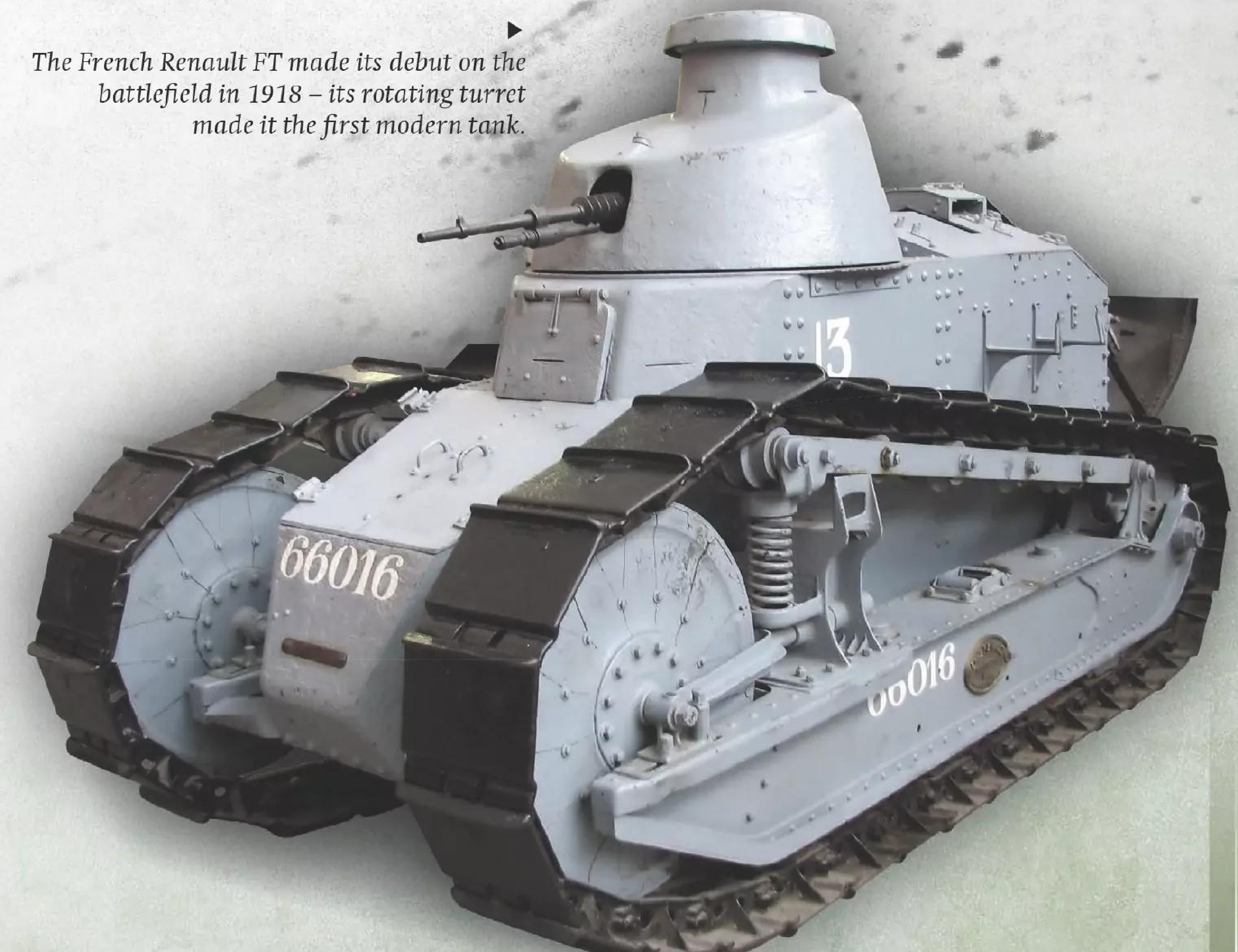
The new invention initially had a certain positive effect on troops' morale who had harboured hopes of finally bringing an end to the seemingly endless trench warfare. Later, when the soldiers' hopes had been dashed by reality, tanks were as often seen as undesirable monsters that attracted too much attention, which in turn laid themselves open to hostile artillery fire.

TECHNOLOGY CULTURE ECONOMY EVERYDAY



World's strangest tank

The Russians also tried to develop a tank. The result was Netopyr, which means "bat" – an odd construction with a huge front wheel paired with a rear wheel just 1.5 metres tall that supposedly resembled a hanging bat. On a test run in 1915 the huge-wheeled giant fought in fine style, but shortly after this it hit a birch tree, and the rear wheel got stuck in a hole that the Netopyr could not get out of. Unsurprisingly, the project was abandoned soon after.



The French Renault FT made its debut on the battlefield in 1918 – its rotating turret made it the first modern tank.

After the war tanks were not regarded as an unambiguous success, bringing into question their long-term future and several members of the British army leadership even spoke again of completely abandoning the new war machines.

After the debates played out, the tanks proponents won the discussion. They believed that Tritton and Wilson had developed a new weapon with the potential to revolutionise modern warfare – and the tanks' role in the next world war proved that they were right.

In World War I, tanks were solely intended to support the advancing infantry, but with World War II and the German Blitzkrieg concept, caterpillar-driven vehicles took the lead when the giant beasts roared through the enemy lines and deep into the hinterland, where they created panic by cutting off supply routes.

It's true to say that by the end of World War I the tank era was only just about to begin. ■

THE FIELD HOSPITAL

1914-1917

Just behind the front line, intrepid nurses and doctors fought to save their countrymen. In unsanitary field hospitals often established in ancient ruins, they amputated legs and arms, saved eyesight after gas attacks, gave blood and tried to figure out what had struck so many apathetic soldiers who simply stared blankly into space. Their experience among the horrors of World War I would play a crucial role in the development of medical science.

1914-17

1914: Red Cross opens the first hospitals exclusively for soldiers.

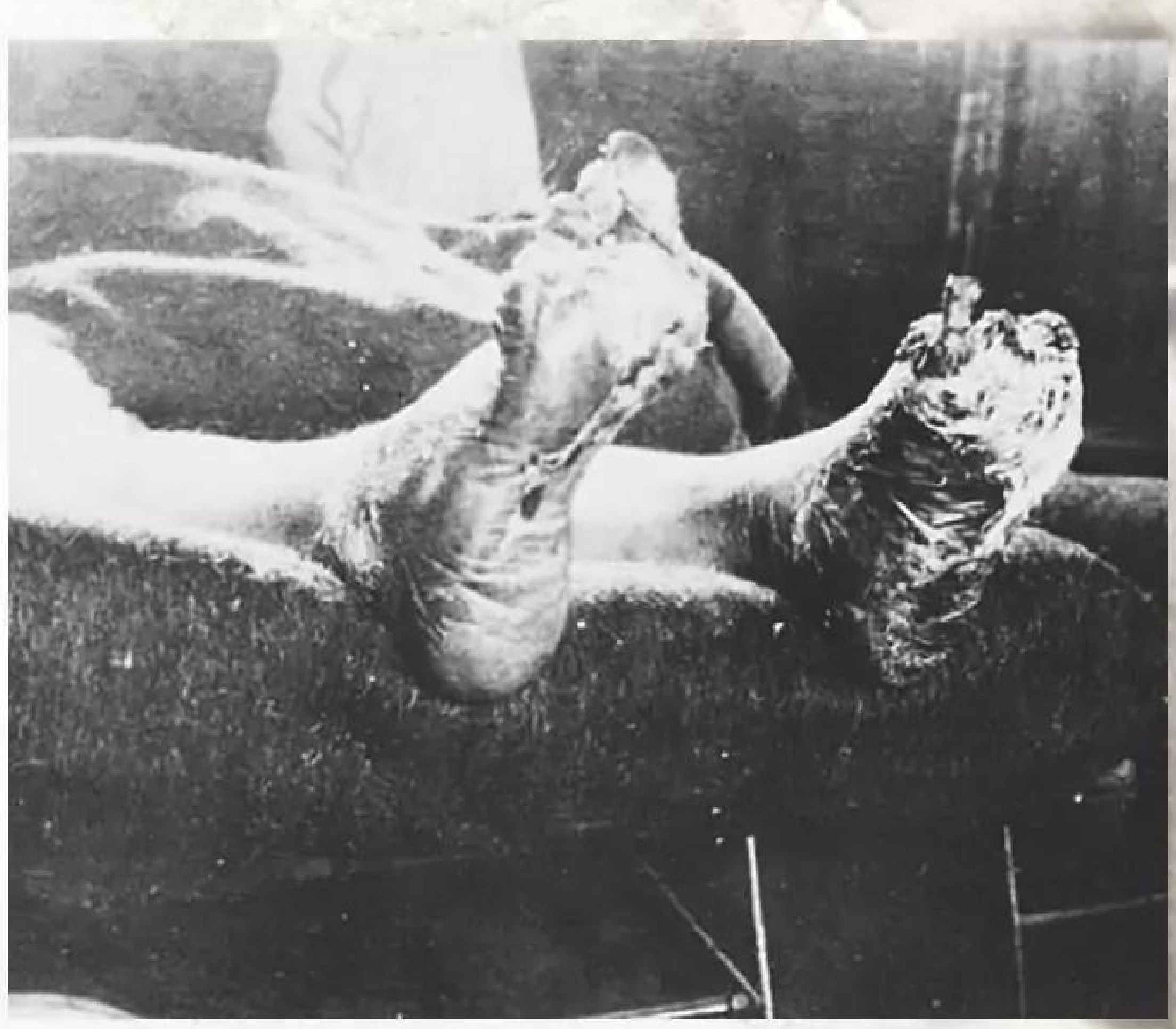
1915: a special British military unit for dental care is set up.

1916: folded stretchers are first deployed to the trenches.

1917: plastic surgery repairs a facial wound for the first time.

1917: blood transfusions are now commonplace at the front.

1914 1915 1916 1917 1917



If a foot developed gangrene, then the only treatment was to amputate the leg.

World War I was one of the bloodiest wars ever. Eight million soldiers ended their lives in or around the battlefield, while over 21 million more were hit by bullets, grenades, gas, trench foot, trench fever, shell shock, typhoid or one of the other perils that were part of the horrors of war.

Doctors and nurses in field hospitals made an invaluable contribution in the fight to ensure the wounded might come home to their families again instead of being added to the list of those who died. The horrific environment of the war meant, however, that it was often impossible to help the injured – both at the field hospitals a short way from the front where there was an acute lack of manpower and vital supplies like anaesthesia, needles and gauze, and the makeshift clinics at the trenches, where stretcher bearers risked their lives to bring in the wounded, and doctors operated under the risk of shell or gas attacks.

32-year-old English nurse Jeanne Louise found her experiences in the trenches worse than anything she could have imagined. She summed up her experience by saying that while she'd been a war nurse for a year, she'd seen horrors she'd otherwise not have experienced in 100 years. She wrote this about her first patient:

"Upon reaching my destination at the trenches, I was bombarded by the horrifying sounds of constantly artillery fire, men howling in pain, and the disgusting smell of rotting flesh. My first patient was a man with a bad case of trench foot. My job was to hold the man's arm, while another doctor sawed his leg off. It took us about two hours, and all that I could hear was the artillery fire, and the man I was holding crying out to us to put him out of his misery. Finally, after 40 minutes of crying and shouting, the man lost consciousness, and just in time, because I could not bear to listen to his pleas another minute".

SWIFT AID WAS CRUCIAL

Whatever doctors and nurses could do, a wounded soldier's survival depended largely on how quickly he could be got to them. Treatment needed to be started as close to the front line as possible and the first stop for a wounded British soldier was the Regimental Aid Post. These lay just a few metres behind the front line in a communication trench, a ruined house or a deep shell crater and were manned by the battalion's medical officer along with his orderlies and stretcher bearers. Treatment was typically limited to dressing the patient's wounds and applying various ointments.

Trench foot was the result of permanently cold and wet feet. It could lead to gangrene and amputation.

From here the patient was either sent back to the front if he was able to fight, or transported further back to an Advanced Dressing Station, a few hundred metres behind the front line. These were established and staffed by the Field Ambulance, the most advanced unit in the Royal Army Medical Corps. Here the injured could receive further treatment and if they were unable to return to their unit, they were sent by horse or motor vehicle to a Main Dressing Station, about 1.5 kilometres further back and so outside the range of heavy artillery fire.

The wounded could spend up to a week or so here before either returning to the front or being sent on to a Casualty Clearing Station, which was a tent camp about 20 kilometres behind the front. The CCS offered specialised medical or surgical treatment and a patient could remain here for up to four weeks. If they still weren't ready to return to the front, they were transferred to an actual hospital, typically a former civilian hospital in a major city and usually close to the railway, to facilitate the fast and efficient transportation of the wounded.

Here, the patient could remain until he'd fully recovered, could be sent by hospital train or ship to receive long-term or unique specialist treatment, or until he'd received his official military discharge.

Once a soldier had been hospitalised, his chances or survival were good. Official figures from the British Royal Army Medical Corps show that while 39,879 men died in the hospital, 169,842 returned to service.

SICK ATTENDED MORNING PARADE

One man who served in the Royal Army Medical Corps was Australian doctor and captain Eric Payten Dark. He received the Military Cross for his efforts and eventually wrote of his experiences during the war as a doctor in the 9th Field Ambulance at the front in Flanders after turning 80.

Dark revealed that the day began with "morning sick parade, where all the men who were sick, or thought they were, reported for examination and treatment". Those too sick to remain were sent back for treatment, while

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Treatment started with first aid on the stretcher close to the front line. Minor wounds were patched up quickly, so soldiers could return to battle.

SISTER ALICE ROSS-KING *1887-1968*

ONE OF THE FRONT LINE'S ANGELS

■ Australian Alice Ross-King was a war nurse from the outbreak of war. In November 1917 she helped close to the front at Rouen. The wounded poured in and the days were long and hard. When things started to quieten, the doctor asked her to get some rest. But on the way to her tent, Alice heard some weak moaning noises. She searched until she found their source: 53 seriously wounded German prisoners who'd been completely forgotten over the previous three chaotic days. "Shall never forget the cries that greeted me. They were badly wounded and had no water or food. Every one of the staff was dead beat, but at last I got old Canada (doctor) to come and fix them up. We did the 40 (13 were dead) in 3/4 hr. No waiting for Chloe (chloroform) – amps (amputations) and all – on to the train 1½ hrs after I found them".

Nurse – Activist – Recipient of the Florence Nightingale Medal from the Red Cross

> “My first patient was a man with… trench foot. My job was to hold the man’s arm, while another doctor sawed his leg off. It took us about two hours”

> “He fell onto the stumps… and, incredibly, took two or three stumbling steps”

those who were “only a little off colour” received a pill and were sent back to their unit. The third and final category included those believed to be faking illness in order to be sent away from the front.

“Any man whom you were sure was malingering had his duty sheet marked in red ink and sent back to his CO who would deal with him as he thought fit”.

SIX MEN CARRIED A SINGLE STRETCHER

Given the hardships that soldiers had to endure, it’s not surprising that some tried to escape. But doctors on the front line were also exposed, and many lost their lives. But it was the stretcher bearers who were most vulnerable among the medical staff.

Sergeant Robert McKay was a stretcher bearer in the 109th Field Ambulance, and his diary recalls the Third Battle of Ypres in 1917 where, among other things, they needed six men to carry a single stretcher because of the muddy conditions. At the same time, the enemy threw grenades directly at them, even though the unarmed bearers shouldn’t have been targets. On 19th August he wrote:

“I have had no sleep since I went on the 13th. The 109th Field Ambulance alone had over thirty casualties, killed, wounded and gassed – and this out of one hundred men who were doing the line”.

36,879
Britons died in field hospitals, while 169,842 were returned to the front.

Captain Dark, who led the bearers on several occasions, recounts even worse statistics. One day there were 20 dead or wounded from a total of 32 men, another it was 45 out of 80. Thus, the percentages show that being a stretcher bearer was no cushy number. The work was, however, extremely important, and Dark recalled how great efforts were made to secure as good stretcher bearers as possible, because it was critical that the wounded received prompt treatment to improve their chances.

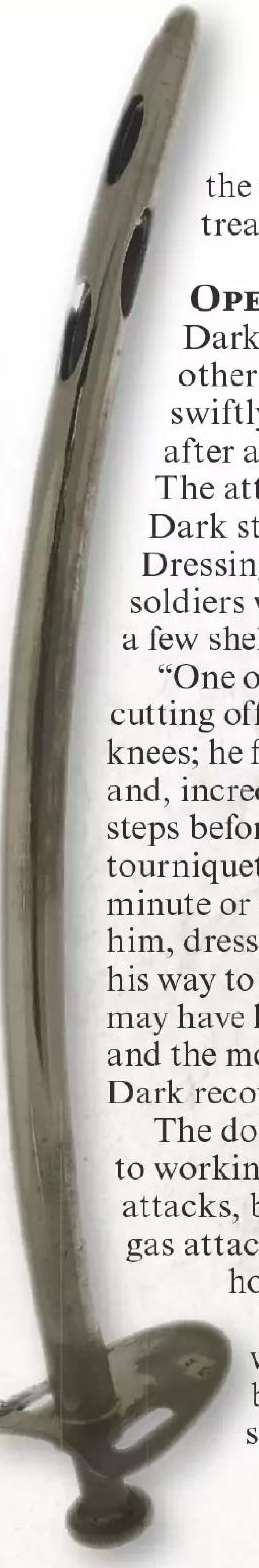
OPERATIONS IN SHELLING

Dark also described how he and the other doctors were compelled to work swiftly. One such experience occurred after an extensive German offensive. The attack was coming to an end, and Dark stood in front of his Advanced Dressing Station watching a group of soldiers walking on the road nearby when a few shells fell over them.

“One of them got a direct hit on a soldier, cutting off both his legs just above the knees; he fell onto the stumps of his thighs and, incredibly, took two or three stumbling steps before collapsing. In seconds we had tourniquets on his thighs, and in another minute or so a big injection of morphia into him, dressings on his stumps, and he was on his way to the Casualty Clearing Station. He may have lived, for he lost very little blood, and the morphia would minimise shock”, Dark recounted.

The doctors quickly became accustomed to working under both shelling and gas attacks, but for Captain Dark one such gas attack in the autumn of 1917 sent him home from the war.

On 16th October, Dark along with 11 squads of stretcher bearers established a dressing station just behind the front line, and around midnight the German artillery began to stir. Soon, Dark heard the “plop” sound that indicated there were gas shells, so the group had to don their gas masks. There was

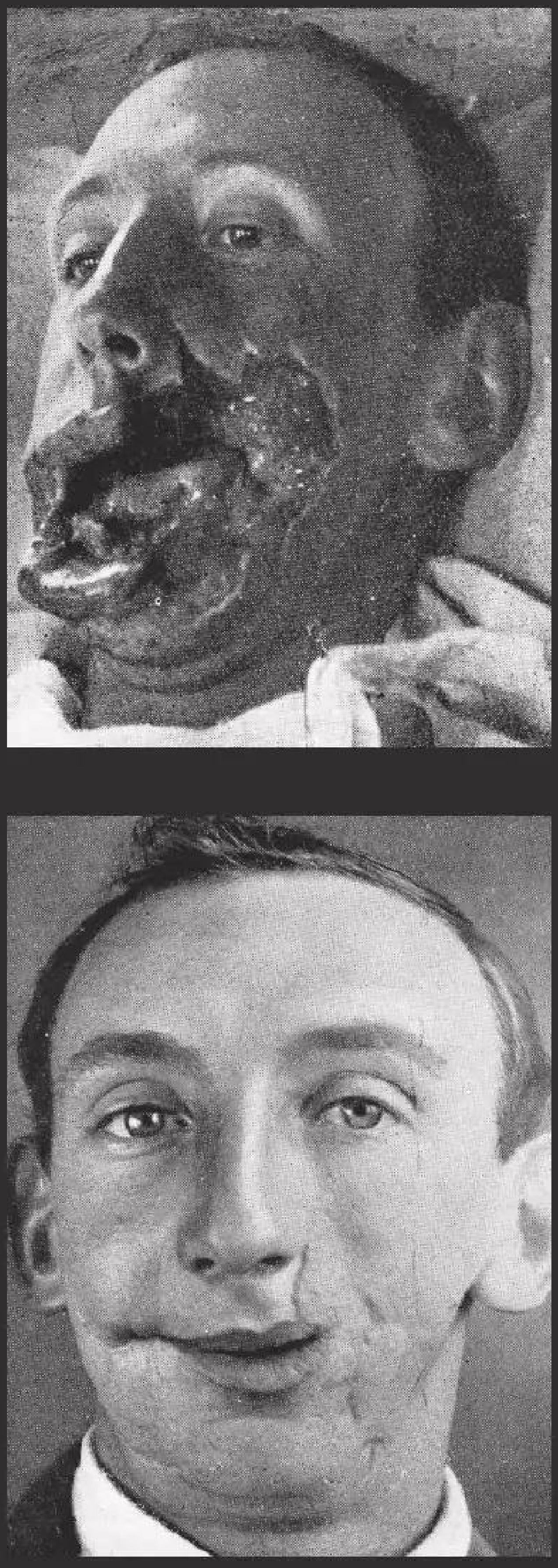


German catheter for draining urine out of the body.

WAR ADVANCED MEDICAL SCIENCE

The terrible damage inflicted on soldiers’ bodies and minds during World War I had one positive result: it led to important advances in medical science. Innovative solutions – often desperate measures – were tried that would probably have never been considered in peacetime, and those that showed promise were further developed during and after the war.

DENTAL SURGERY
Teeth that had been destroyed by – for example – shelling or gunshot were replaced with dentures that were attached to the remaining teeth. Many soldiers also developed trench mouth – inflammation of the gums triggered by a combination of poor hygiene and severe stress. The war led to a greater focus on dental health.



PLASTIC SURGERY
The trenches protected soldiers’ bodies, but their heads were still vulnerable, and shells and shrapnel inflicted facial injuries never seen before. Surgeon Harold Gillies witnessed this at the Western Front in 1915. The following year he established a facial injury ward at the Cambridge Military Hospital in Aldershot, where he developed several new methods of plastic surgery, including facial reconstruction through transplanting skin from elsewhere on the body.

Field hospitals were situated well behind the front at a safe distance from grenades and artillery. They were often set up in ruins and run by nurses.

a constant stream of wounded passing through, and just before dawn a large shell hit one the block houses the British had constructed, collapsing it with two men seriously wounded inside.

Carried through shelling

"When I got there with a corporal, Sachs by name, and stretcher bearers, I found that both the men had compound fractures of the femurs. We had our gas masks on, as the all clear had not yet sounded, and set about trying to fix the men up. In the conditions, with… our sight constantly blurred by fogged eye-pieces, it seemed impossible ever to get the wounds dressed and the fractures properly put up on Thomas's splints.

"After fumbling about for some time I made a decision, and told Sachs, 'Look Corporal we are getting nowhere; you and I will take off our masks so that we can do the job properly'", Dark continued. "He made no demur, and worked well and dexterously to help me get the men fixed and away. It was a horrible night, and by dawn 32 of my 44 bearers were casualties, mostly gassed, ultimately 16 of them died, including Sachs, a good man, whom probably my order killed".

Dark himself only narrowly avoided death from removing the gas mask. When his relief arrived around noon, he found Dark almost blind – the gas had caused his corneas to swell, and Dark was also throwing up constantly. When the doctor sent him back to a Casualty Clearing Station by stretcher, Dark experienced the journey he'd sent so many other wounded on.

"I felt horribly exposed, hoisted on the shoulders of the four bearers, for shells still fell sporadically".

Dark arrived at the station late in the afternoon and was placed in a tent. The next morning his vision had completely gone, and he was blind for four or five days while also coughing up blood. Dark remained there for 10 days before he was sent to a hospital in Boulogne, and after a week he was shipped – again by stretcher – to Britain. Dark had come close to losing his life to the gas, and his war had now ended.

One needle, two hospitals

Dark's description of his days at the front's Casualty Clearing Station and then in hospital at Boulogne placed great emphasis on the nurses' attention and good work, and he reserved praise for one in particular:

"She was Scottish – very – with a rather square face and a square figure compensated for by a good head and a good heart. I shall remember Sister Gregg with pleasure".

As the doctors couldn't – obviously – do everything themselves, nurses played an

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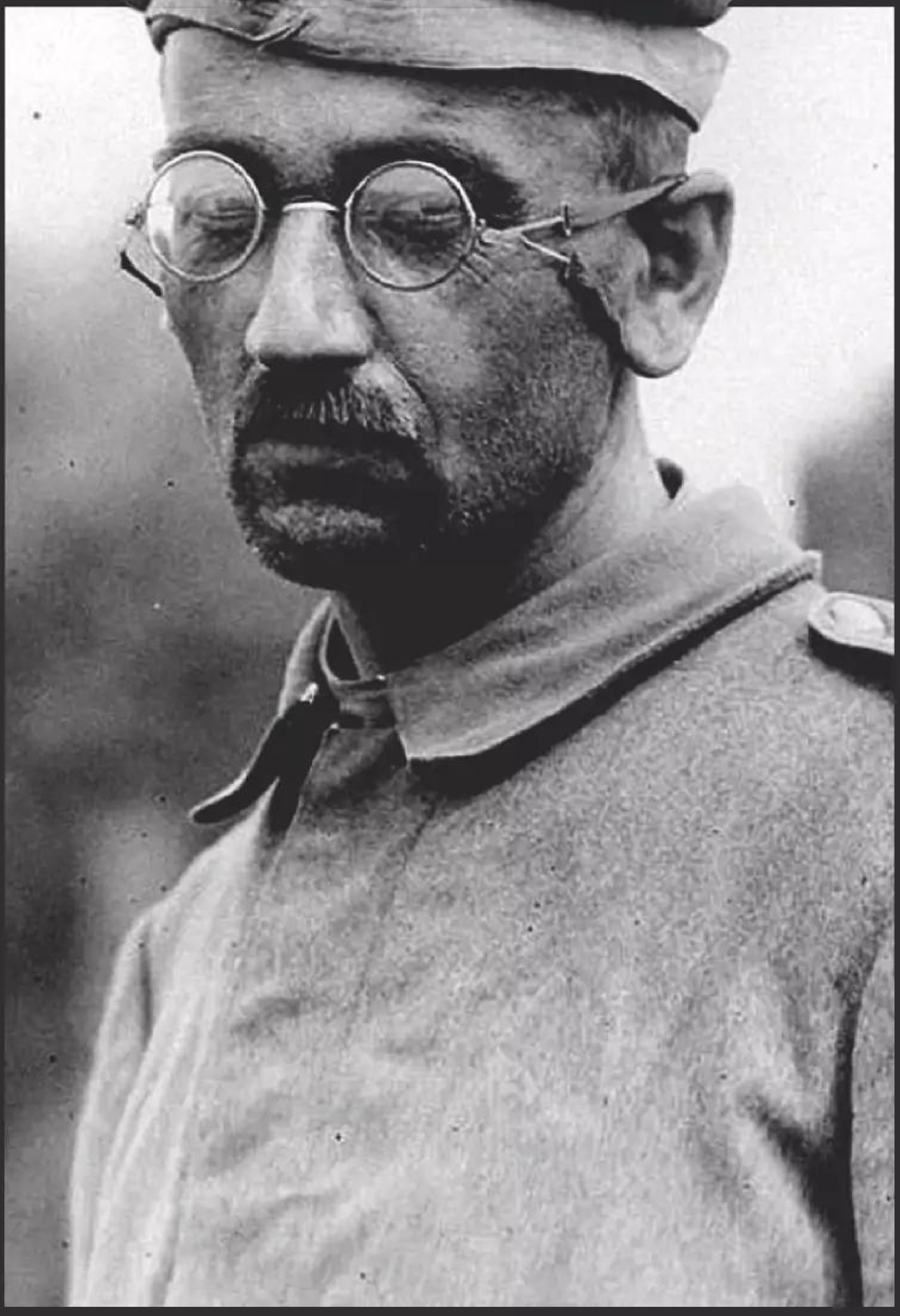
BLOOD TRANSFUSION
Canadian surgeon Major Lawrence Bruce Robertson and US doctor Captain Oswald Hope Robertson discovered that direct transfusion of non-matched blood from the veins of a donor to patient could save lives, while extracted universal donor blood could be tested for syphilis and stored. Their combined efforts in proving blood transfusion's potential is considered the most important medical advance during the war.

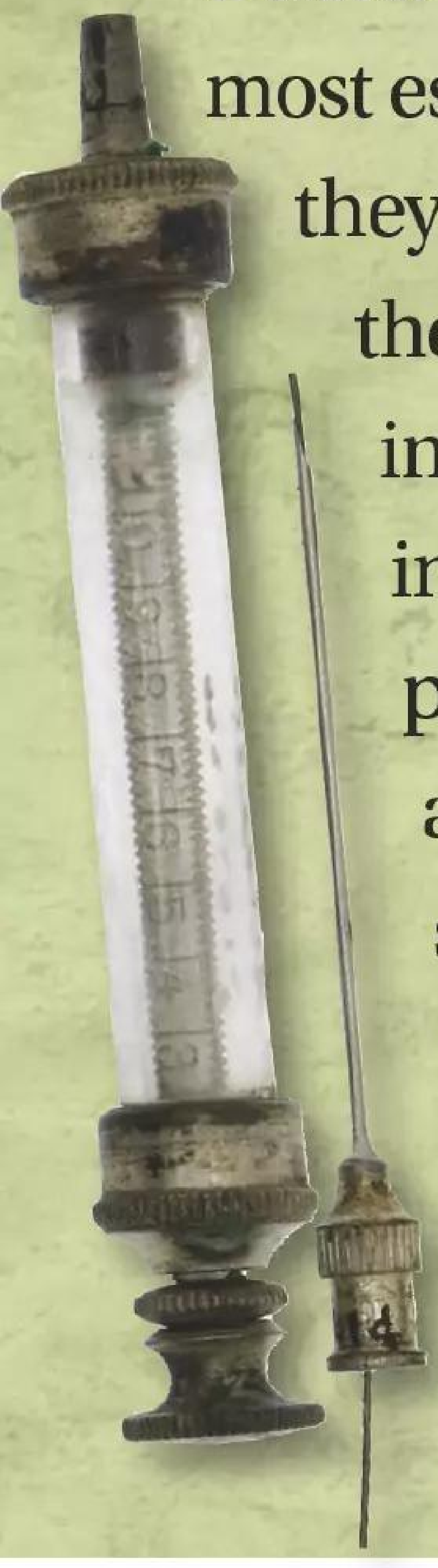


SHELL SHOCK
Anxiety, confusion, memory loss, soldiers who could barely work for tremors or who developed bizarre facial tics – these were all symptoms first seen as a sign of a physical injury to the nerves, and if not indicated the patient was simply a coward who wanted to avoid fighting. Gradually it was discovered that shell shock was a psychological reaction caused by extreme stress, leading to experimental treatments such as counselling and hypnosis.

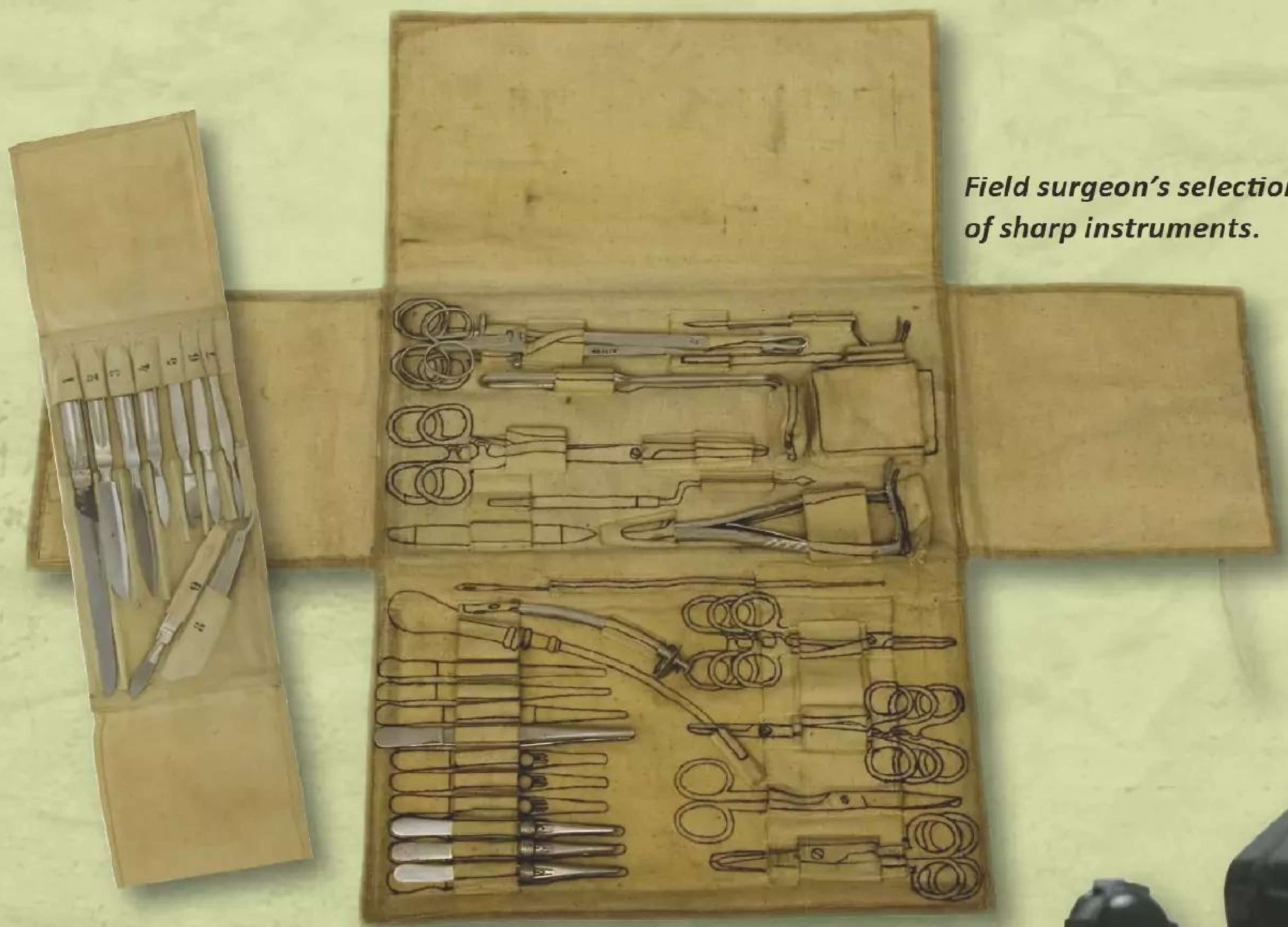
FIELD SURGEON'S KIT WAS SIMPLE AND EFFICIENT

It could take two hours to amputate a leg – even with a heavy saw.

Doctors at the front carried only the most essential equipment so that they could easily move around in the trenches and away from incursions. Many operations, including amputation, took place without anaesthesia and in non-sterile surroundings. Despite this, many wounded survived. The doctors were quick to stop blood loss.

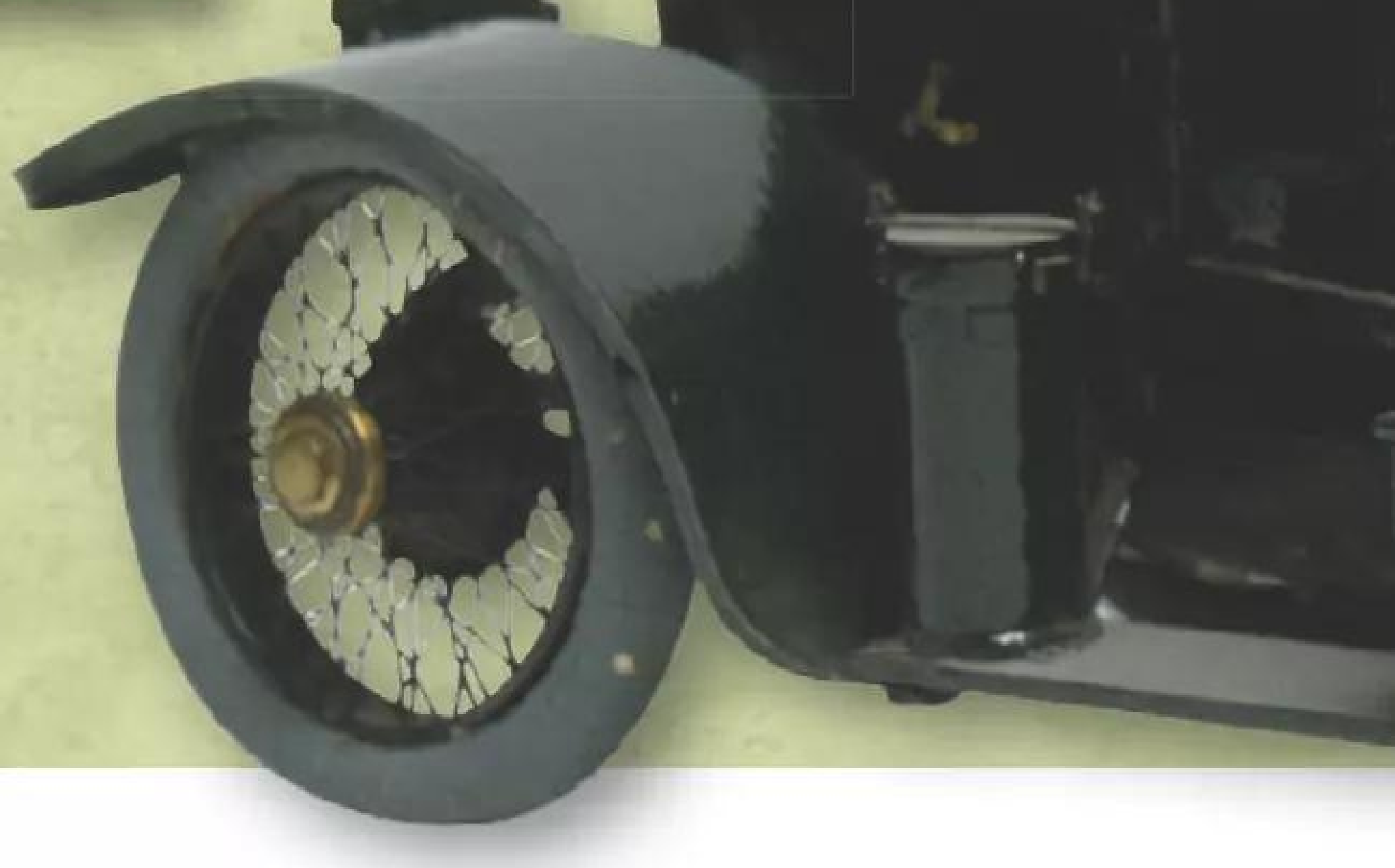


The syringe lay in a canvas holster that could fit in a uniform pocket.



Field surgeon's selection of sharp instruments.

Often, several doctors were forced to share a single needle.



almost equally important role in the treatment of the wounded – and many, like Captain Dark, developed very warm feelings towards any nurse who took care of them.

An American nurse, who was named Mademoiselle Miss by her patients, worked at a French hospital near the front. She wrote a series of letters home that were published anonymously and without her knowledge, hoping to raise money for hospitals. Mademoiselle Miss recounted how she received letters on almost daily basis from former patients back in the trenches who thought of her with gratitude At the hospital Mademoiselle Miss was responsible for 34 lives, "more than half of which hang in the balance", and there was a pressing need for outside help. She revealed that she only had a single needle to administer around 15 injections every day – and then a doctor would often arrive and ask to borrow it for another hospital.

LAME SOLDIER WALKED AGAIN

Many wounded soldiers were in a terrible state and proved impossible to save. But despite this and despite the scarcity of equipment and resources, it was possible to save many.

A Canadian nurse at a hospital in France, whose letters were also published to raise money, tells of a man who arrived paralysed from the waist down.

"One poor chap was shot through the body and the spine was injured; they do not know just what the extent of the injury is, but he is completely paralysed from the waist down… When he was shot he simply had the sensation of his legs disappearing. When he fell he said to a comrade, 'Both my legs have gone', but he had no pain at all. His comrade assured him that he had not lost his legs, but he said he could not believe it until he got to the hospital. He has received the Médaille Militaire for bravery, and his comrades said he certainly deserved it", she wrote.

In a letter six months later, she mentioned the soldier again. "My paralysed man stood up alone last Sunday for the first time and now he walks, pushing a chair before him like a baby. He is the happiest thing you can imagine; for seven months he has had no hope of ever walking again".

DEATH OF A PEARL FISHERMAN

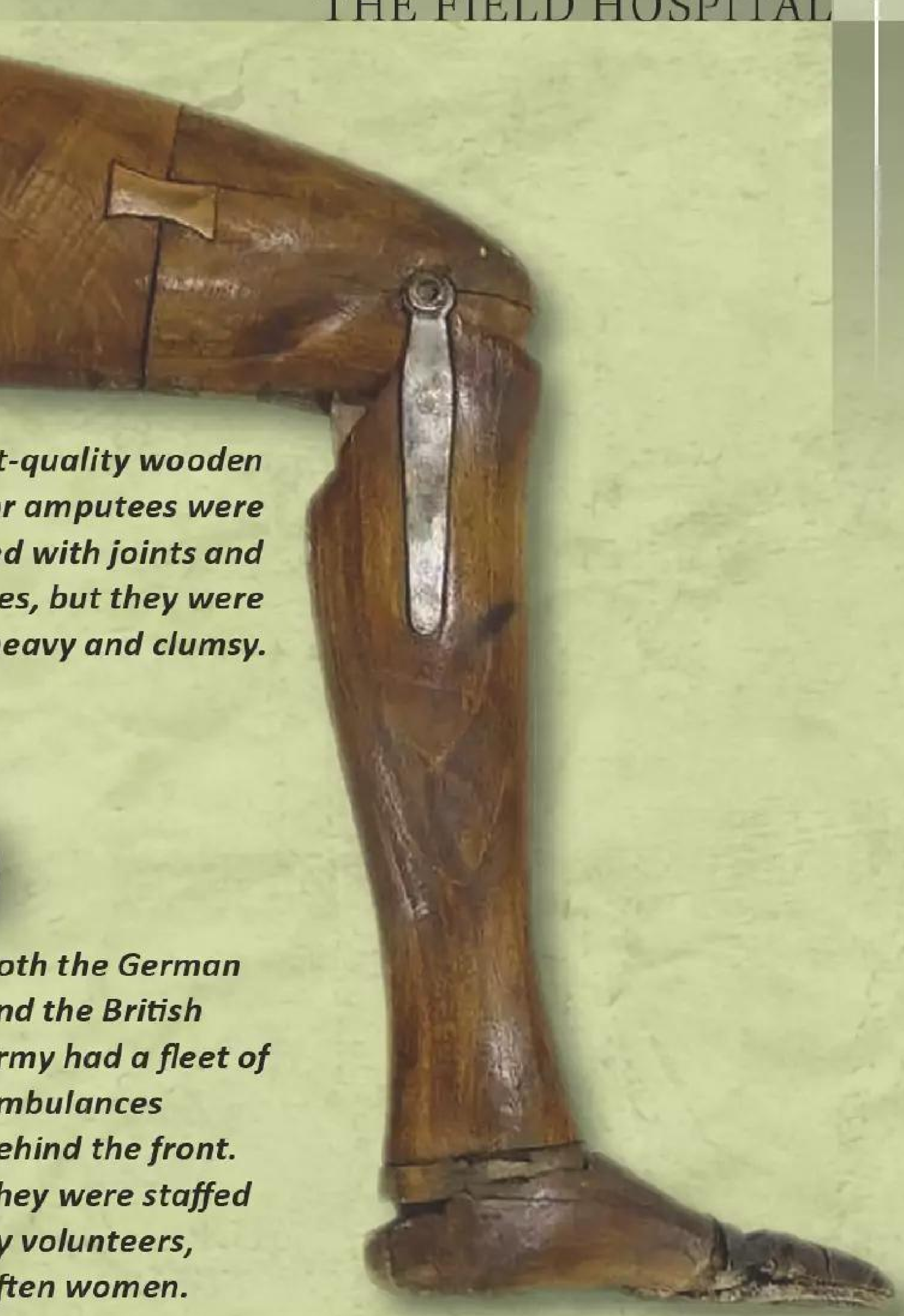
These miraculous recoveries helped offset the effects of so many hopeless cases. But

TECHNOLOGY.............. CULTURE............... ECONOMY...... EVERYDAY.......

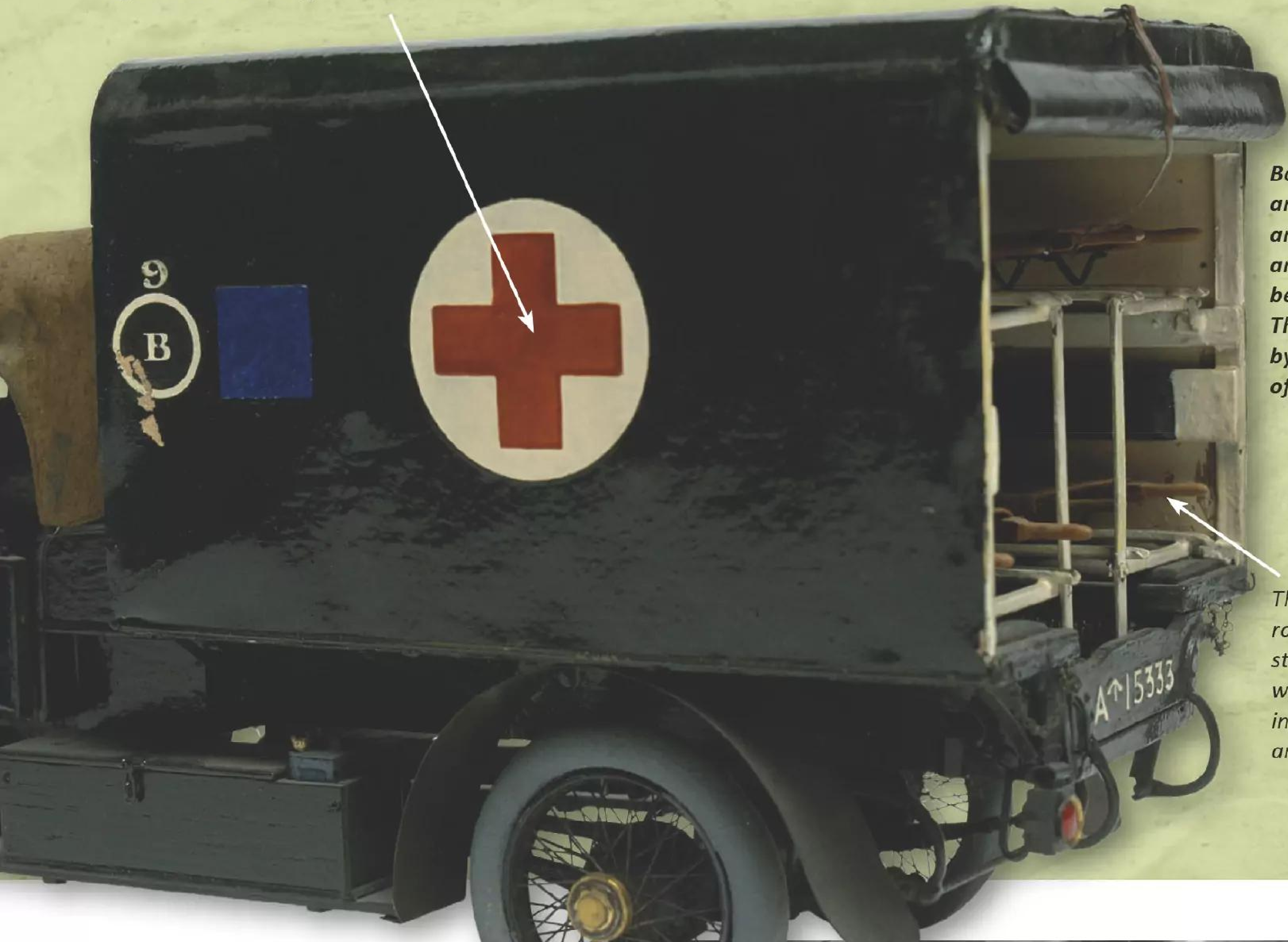
War veterans died young

Around 250,000 British soldiers were amputated during World War I. Those who returned home while the war still raged were treated as heroes, and their wounds were marks of honour that showed patriotism and courage. But after the war, the invalided veterans became unpleasant memories of a time everyone wanted to forget, and their situation became more difficult. Generally, the war aged veterans prematurely, and many of them died at a young age.

Small quantities of iodine, morphine and some dressings made up the contents of a military first aid kit.



The best-quality wooden limbs for amputees were equipped with joints and hinges, but they were heavy and clumsy.



The ambulance had a clear Red Cross logo to avoid shelling.

Both the German and the British army had a fleet of ambulances behind the front. They were staffed by volunteers, often women.

There was room for four stretchers with wounded in each ambulance.

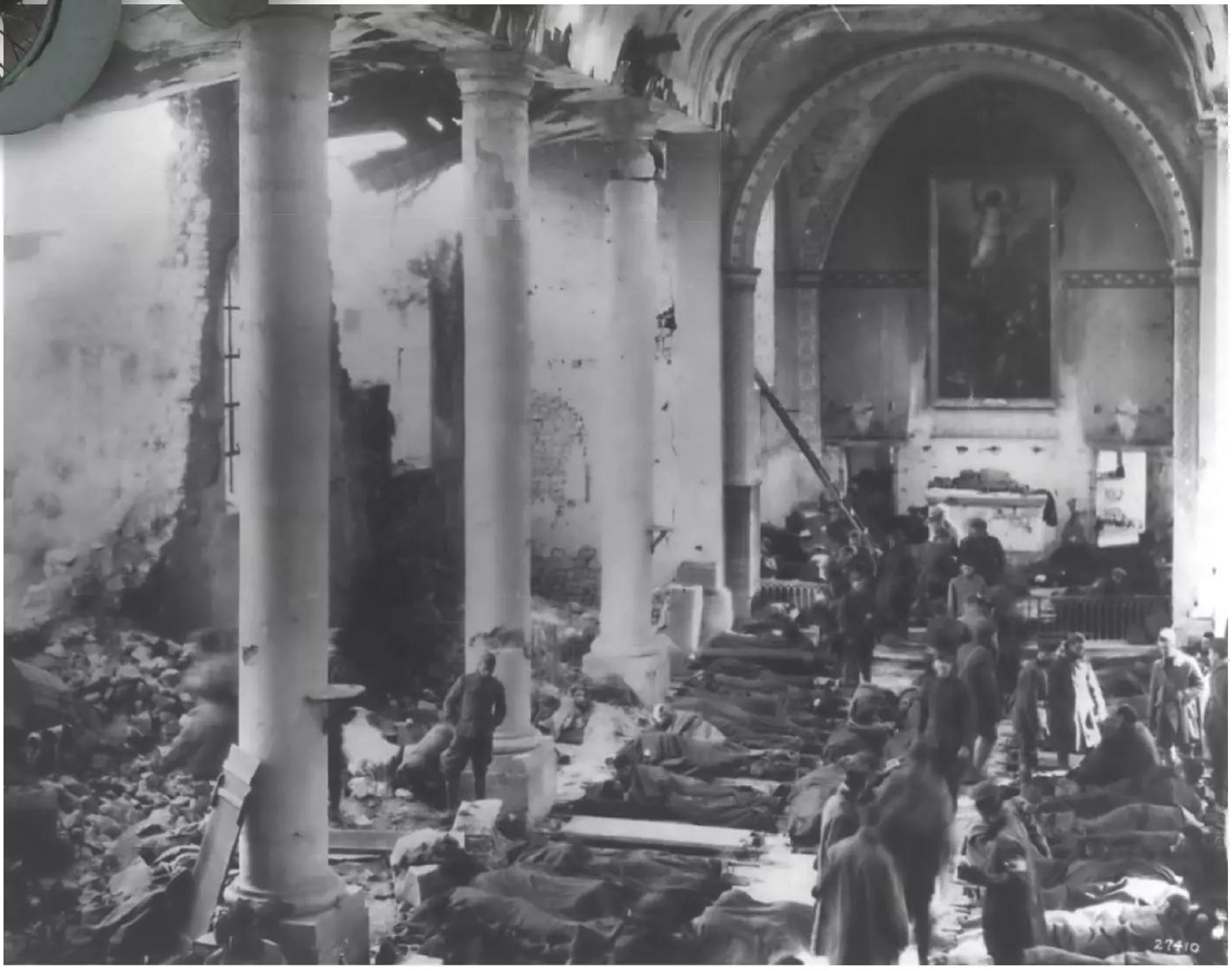
Fein Mittel Stark

Suture came in three strengths: fine to strong.

part of the job was to say goodbye to the dying. And sometimes, as in one case recorded by Mademoiselle Miss, death passed quietly and peacefully for her patients.

"A pearl fisher, a good Catholic and a brave fighter had come from the sunny shores of Guadeloupe to die for France. When they amputated his leg they didn't discover that there was a ball in his back. I found it… but then it was too late. Every day the fever mounted higher, and every day his black cheeks grew thinner; but he always kept saying 'It is going well', in the sweet caressing tones that recalled early lullabies. Never a murmur, always a smile.

"The last day our faithful priest confessed him; he knew just enough French for that and it was moonlight when he went one of us kneeling either side. After Extreme Unction he pressed my hand; and suddenly a marvellous change passed over his face as if it had grown white and luminous. 'Mama', he murmured, 'Louis', then fainter and sweeter 'O mon bon Dieu', and it was over, and nothing remained but a radiating smile. I went to lay him away among the heroes; and if ever I doubted how to die, my black pearl fisher from Guadeloupe has shown me the way". ■



A shattered French church was requisitioned as a field hospital for US soldiers in 1918. The men lay on stretchers on the floor where the lucky were seen to by doctors and nurses; others had to fend for themselves.

DEATH IN THE MUD

1917

After the soldiers on the Western Front dug their trenches in 1914, the front line of the war remained practically stuck for three years, despite millions of deaths. The Third Battle of Ypres – better known as the Battle of Passchendaele – went down in history as perhaps the most blindingly obvious example of the futility of trench warfare. The Allied offensive's gains were minimal, while more than half a million young men on both sides of the front were killed or invalided in a muddy hell lasting several months. Passchendaele was trench warfare at its worst.

1917

22nd July: the Allies warm up for the Battle of Passchendaele with an intense 10-day bombardment.

31st July: Allies start advancing on German positions.

August: torrential rain turns the battlefield into a mud bath. The offensive grinds to a halt.

September: dry weather allows for more small advances.

October: more rain dissolves battlefield again.

6th November: Passchendaele finally falls to Allied forces. For now.

1917

"Dawn reveals to us a sight which nobody could visualise without having actually seen it. We can stand up and see the round of the horizon. It is like being on the sea, but our sea is a sea of mud".

This was how soldier Alfred McLelland Burrage, from the London Regiment's 28th Battalion, described his first encounter with the battlefield of Passchendaele near Ypres in West Flanders. The landscape here was the scene of arguably the worst battle of World War I, and the name Passchendaele subsequently became synonymous with the pointless horror of trench warfare. Here over half a million young men were killed or maimed – hit by enemy bullets, blown up by grenades or drowned in the colourless mud.

At the beginning of 1917, 28-year-old Burrage had volunteered and even pushed his doctor to be declared fit for duty. Burrage wanted to enlist because he disapproved of the idea of young and fit men with no dependants not serving, "but could not very well express it while I was a civilian myself".

Back home in London, Burrage was a writer, and at the front he now used his writing skills to describe the suicidal attacks the soldiers were now being ordered to perform:

"The first 'ripple' was blotted out. The dead and wounded were piled on each others' backs, and the second wave, coming up behind and being compelled to cluster like a flock of sheep, were knocked over in their tracks and lay in heaving mounds". One of the ghastliest sights after such an attack were the wounded left in no-man's land between the trenches who tried to make themselves visible to stretcher bearers by sticking their rifles in the ground with bayonets at the bottom, so the rifle butt pointed toward the sky.

"There was a forest of rifles until they were uprooted by shell-bursts or knocked down by bullets like so many skittles", Burrage observed.

Volunteer
Canadian soldiers were involved in the heaviest fighting and suffered major losses at Passchendaele.

BATTLEFIELD WAS TURNED INTO MUD BATH

When Burrage arrived at Passchendaele in October 1917, the offensive had already been in progress for the best part of three months.

The idea for the great offensive that became the Battle of Passchendaele was conceived by Field Marshal Douglas Haig – commander of British forces in France and Belgium. Haig had barely gained permission for the offensive as Prime Minister Lloyd George had been extremely sceptical at the idea of launching a new assault on the deadlocked Western Front.

Previous attempts to break through at the front left the government wary about the likely enormous casualties. The German offensive at Verdun in 1916 had seen combined casualties of nearly one million dead and wounded, with the Germans advancing just a few kilometres. During French-led attempts to break the German line at the River Somme that year, 620,000 Allied soldiers died for a gain of just eight kilometres. Nevertheless, Haig now promised a magnificent victory. He argued that German troops' morale was sinking and that a comprehensive assault was precisely what was needed to deliver a final blow to the enemy.

At the same time, it was necessary to halt German U-boats ravaging the North Sea and English Channel, which threatened the Allied war effort.

The plan, therefore, was for Allied troops to break through the German lines and fight their way 40 kilometres north to the ports of Ostend and Zeebrugge, where German submarines sailed out to torpedo hundreds of Allied ships monthly, so tonnes of munitions, supplies and crews were sent to the bottom of the sea.

ONLY 33,500 DEATHS ON FIRST DAY

There had been great battles at Ypres in 1914 and 1915, with both sides advancing and then retreating. But despite some Allied gains, the German defence line west of Ypres was still extremely well developed with solid trenches and concrete bunkers.

Field Marshal Haig's first move was to soften the German defences with an artillery bombardment – the same tactics that had failed at the Somme the previous year. For 10 days from 22nd July, 1917, 3,000 guns fired over four million shells into the German positions. They ploughed up the Belgian countryside turning it into a wasteland, but the vast majority of German trenches and bunkers escaped relatively unscathed. The Germans were therefore on their guard and waiting when Haig ordered the Allied infantry into no-man's land over a front nearly 20 kilometres wide.

The attack went so well, however, that Haig – from his position several kilometres behind the front – could declare the battle's first day a success. Although his forces hadn't penetrated as far as planned, they had in several places advanced more than a kilometre to reach the Germans' second line of defence, the so-called Albrecht Line. At the same time, Allied casualties were a "mere" 33,500 dead and wounded, relatively low numbers for an offensive on the Western

FIGHTING AT YPRES

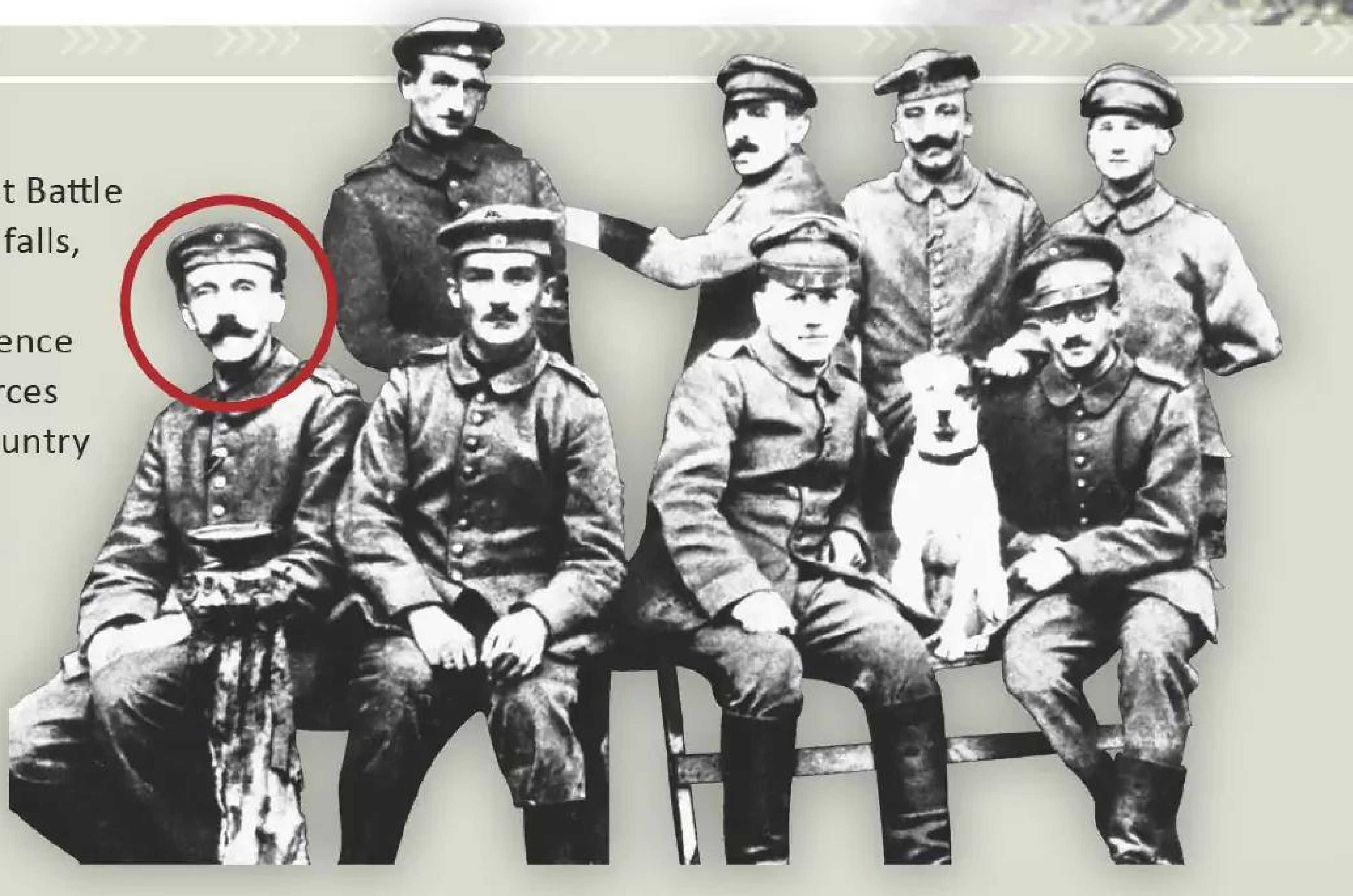
Passchendaele is located near the Belgian city of Ypres, which throughout World War I lay in an advanced, fiercely disputed pocket of Allied territory on the Western Front.

1914

September: "The Race to the Sea" ends in Flanders when German and Allied troops finally reach the North Sea coast at Nieuwpoort in Belgium after numerous failed attempts to outflank the other by moving north and west.

1914

19th October-22nd November: First Battle of Ypres takes place. After Antwerp falls, British forces draw back to Ypres to support the Belgian and French defence of the city. The German advance forces Belgian king Albert I to order the country open its floodgates, flooding a three-kilometre-wide belt between Belgians and Germans. The front moves on slightly, but with heavy casualties on both sides. Among the participants in the fighting is a 25-year old by the name of Adolf Hitler (circled).



British soldiers fought almost as hard against the mud as against the Germans.

1915

22nd April-25th May: Second Battle of Ypres. At sunrise on 22nd April, Germans open 5,730 containers of chlorine gas, and a yellow-green fog rolls towards Allied troops. The Second Battle of Ypres is remembered primarily for the war's first successful gas attack, which affects up to 10,000 soldiers – half die within 10 minutes. But despite the gas attack, the Allies stand firm until a lack of supplies halts the German offensive. Unable to take Ypres, the Germans instead decide to bomb the city to destruction.

1917

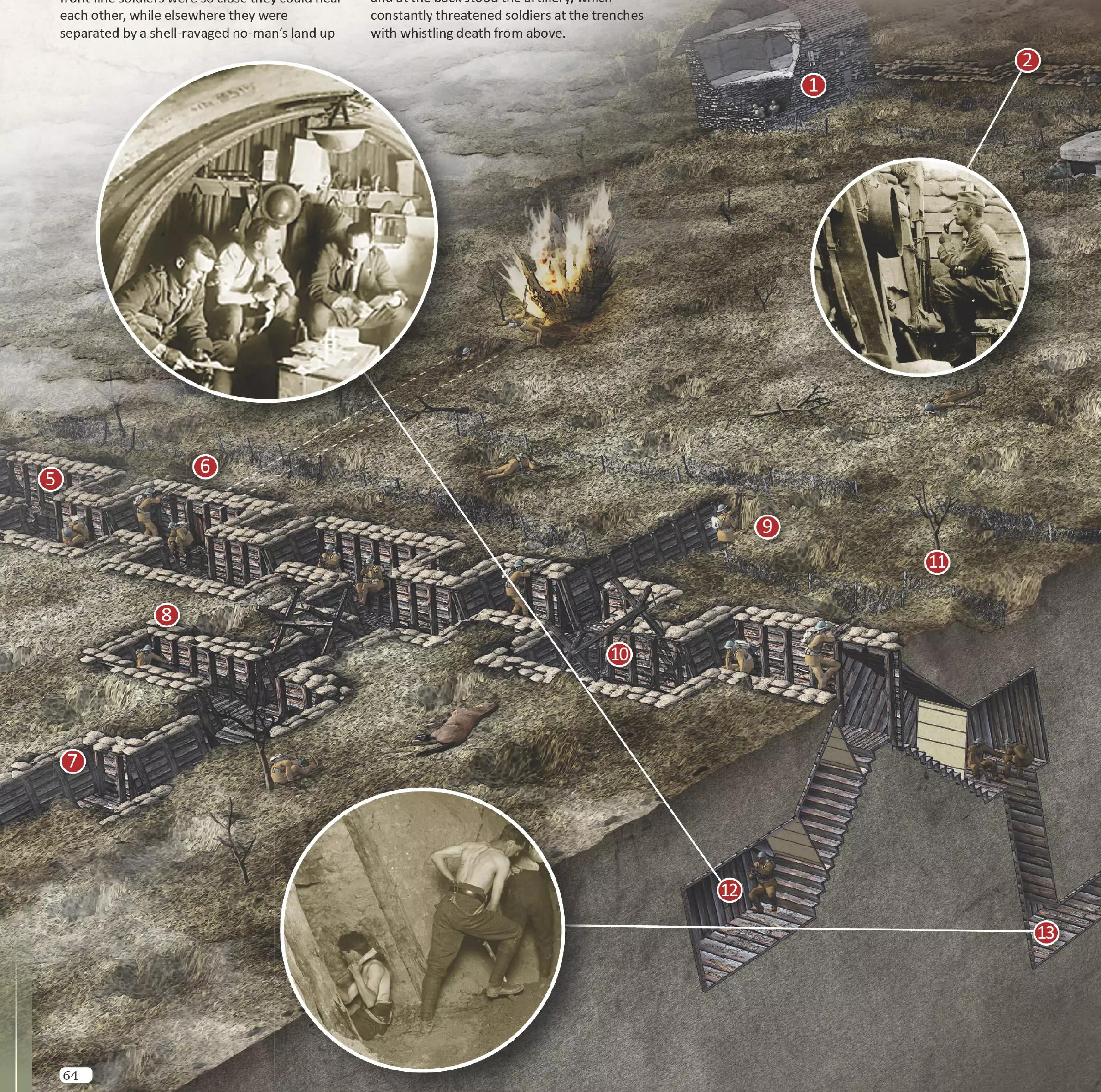
7th June: at 03.10, General Hubert Plumer initiates an offensive by detonating 19 underground mines, containing a total of 600 tonnes of explosives, which have been placed directly under German positions at the Messines Ridge south of Ypres. The work of digging tunnels and laying mines began 18 months earlier, and the result is overwhelming. Around 10,000 Germans die in an explosion that can be heard all the way to Dublin, leaving a giant crater. All the Allied targets are captured within three hours, and the assault is considered one of the great Allied successes of the war.

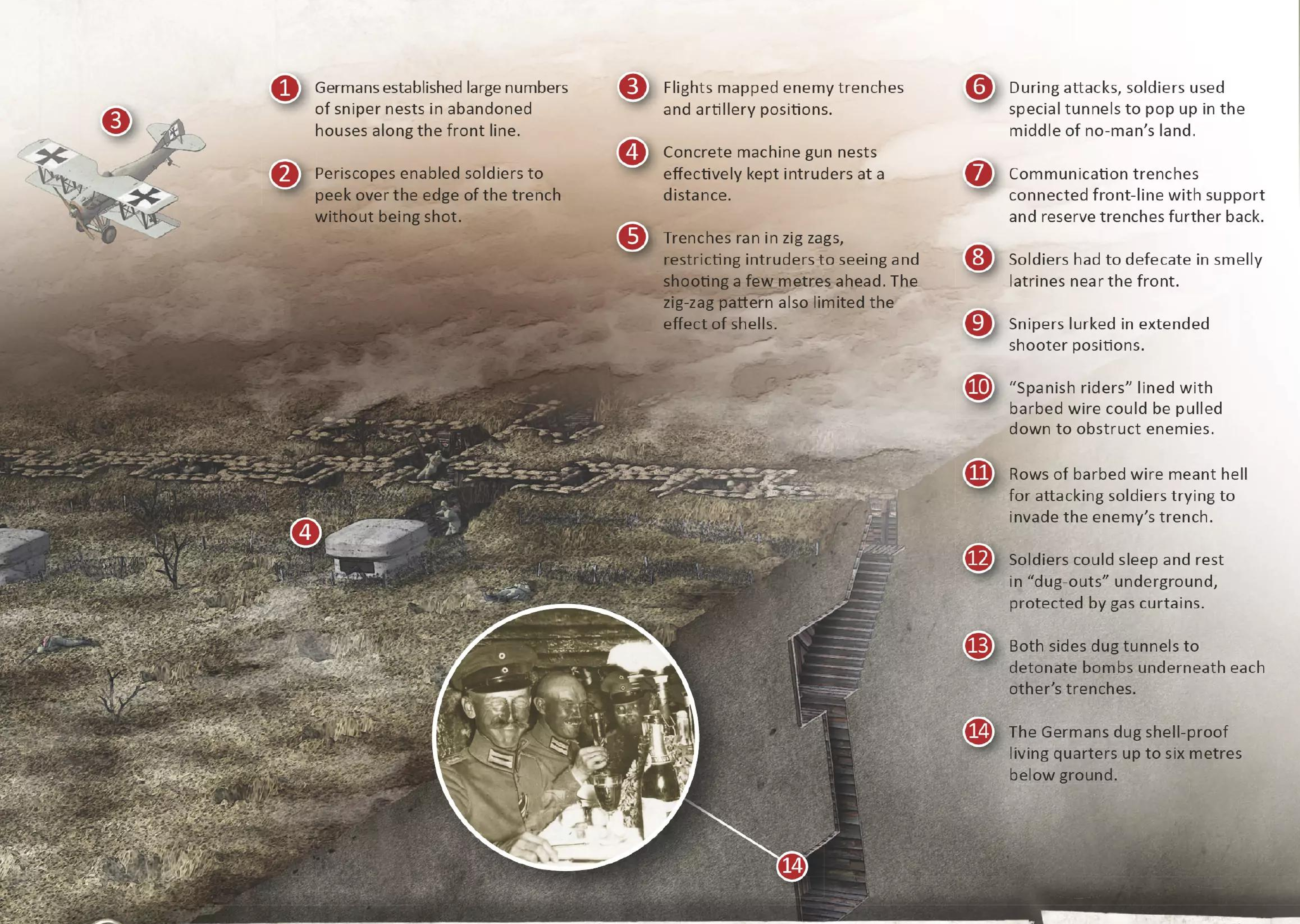
1917

DEADLOCK AT THE FRONT

As the war progressed, trenches evolved from simple ditches to well-developed defences. By the summer of 1917, Germans and Allies guarded each other in almost impregnable trenches protected by barbed wire and machine-gun fire.

■ The Western Front's trenches stretched all the way from the Belgian coast through Flanders and France to the Swiss border. In some spots, front-line soldiers were so close they could hear each other, while elsewhere they were separated by a shell-ravaged no-man's land up to a kilometre wide. The most common distance was between 100 and 400 metres. Behind the front's trenches lay support and reserve lines, and at the back stood the artillery, which constantly threatened soldiers at the trenches with whistling death from above.





① Germans established large numbers of sniper nests in abandoned houses along the front line.

② Periscopes enabled soldiers to peek over the edge of the trench without being shot.

③ Flights mapped enemy trenches and artillery positions.

④ Concrete machine gun nests effectively kept intruders at a distance.

⑤ Trenches ran in zig zags, restricting intruders to seeing and shooting a few metres ahead. The zig-zag pattern also limited the effect of shells.

⑥ During attacks, soldiers used special tunnels to pop up in the middle of no-man's land.

⑦ Communication trenches connected front-line with support and reserve trenches further back.

⑧ Soldiers had to defecate in smelly latrines near the front.

⑨ Snipers lurked in extended shooter positions.

⑩ "Spanish riders" lined with barbed wire could be pulled down to obstruct enemies.

⑪ Rows of barbed wire meant hell for attacking soldiers trying to invade the enemy's trench.

⑫ Soldiers could sleep and rest in "dug-outs" underground, protected by gas curtains.

⑬ Both sides dug tunnels to detonate bombs underneath each other's trenches.

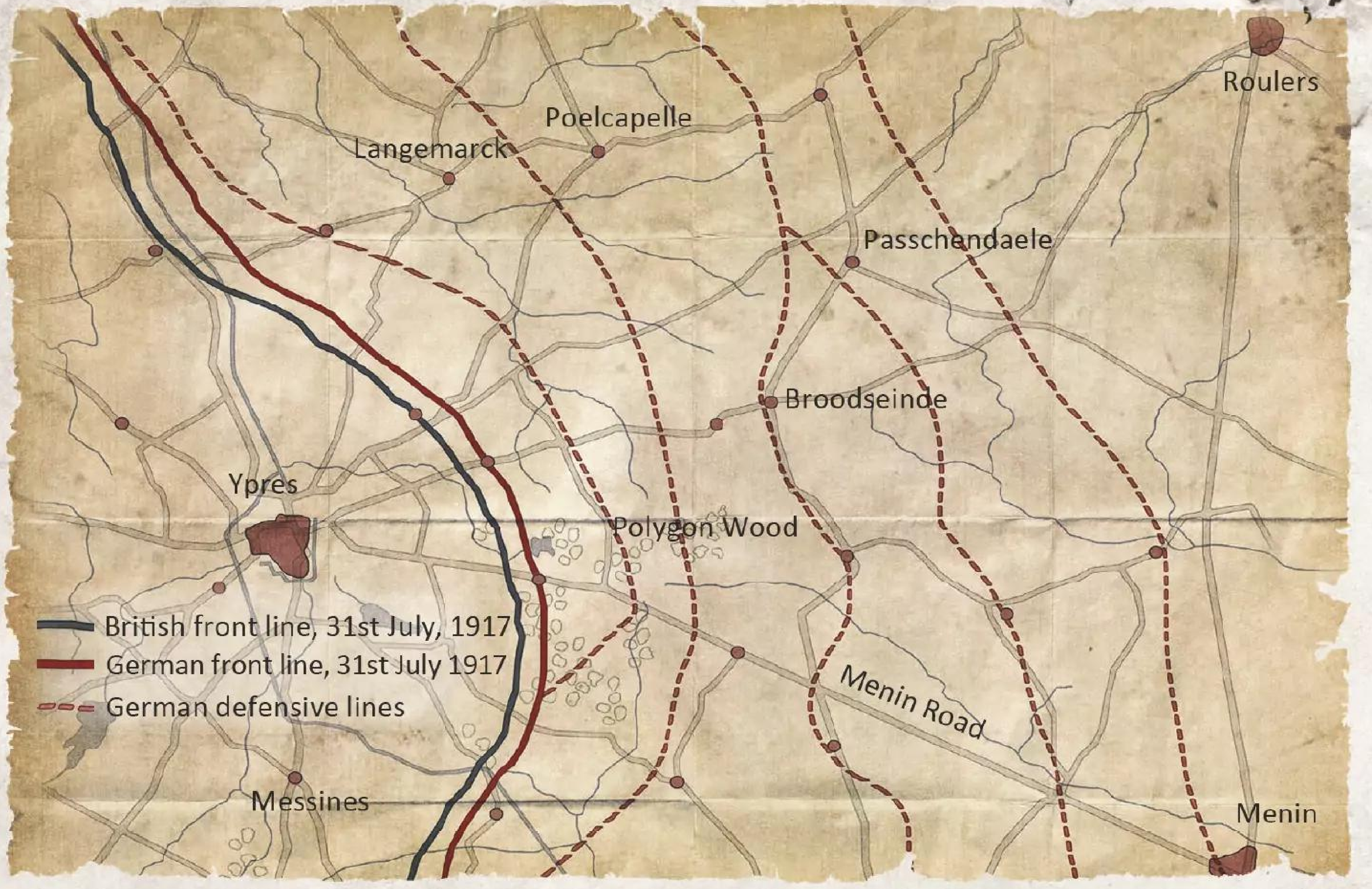
⑭ The Germans dug shell-proof living quarters up to six metres below ground.

Passchendaele lay behind five defensive lines

■ From as early as 1915, Germany's commanders were set on a primarily defensive war on the Western Front. The Germans carefully constructed rows of trenches that were both comfortable for the soldiers and virtually impregnable. If the enemy managed to take one trench, the Germans could simply retreat to the next one further back and had littered the landscape with barbed wire and shooting nests. To reach Passchendaele, the Allies would have to surmount all five German defensive lines – and even then, the Germans had another trench behind the village.

The artillery's accuracy was evident from the number of shell craters (white dots) near the trenches.

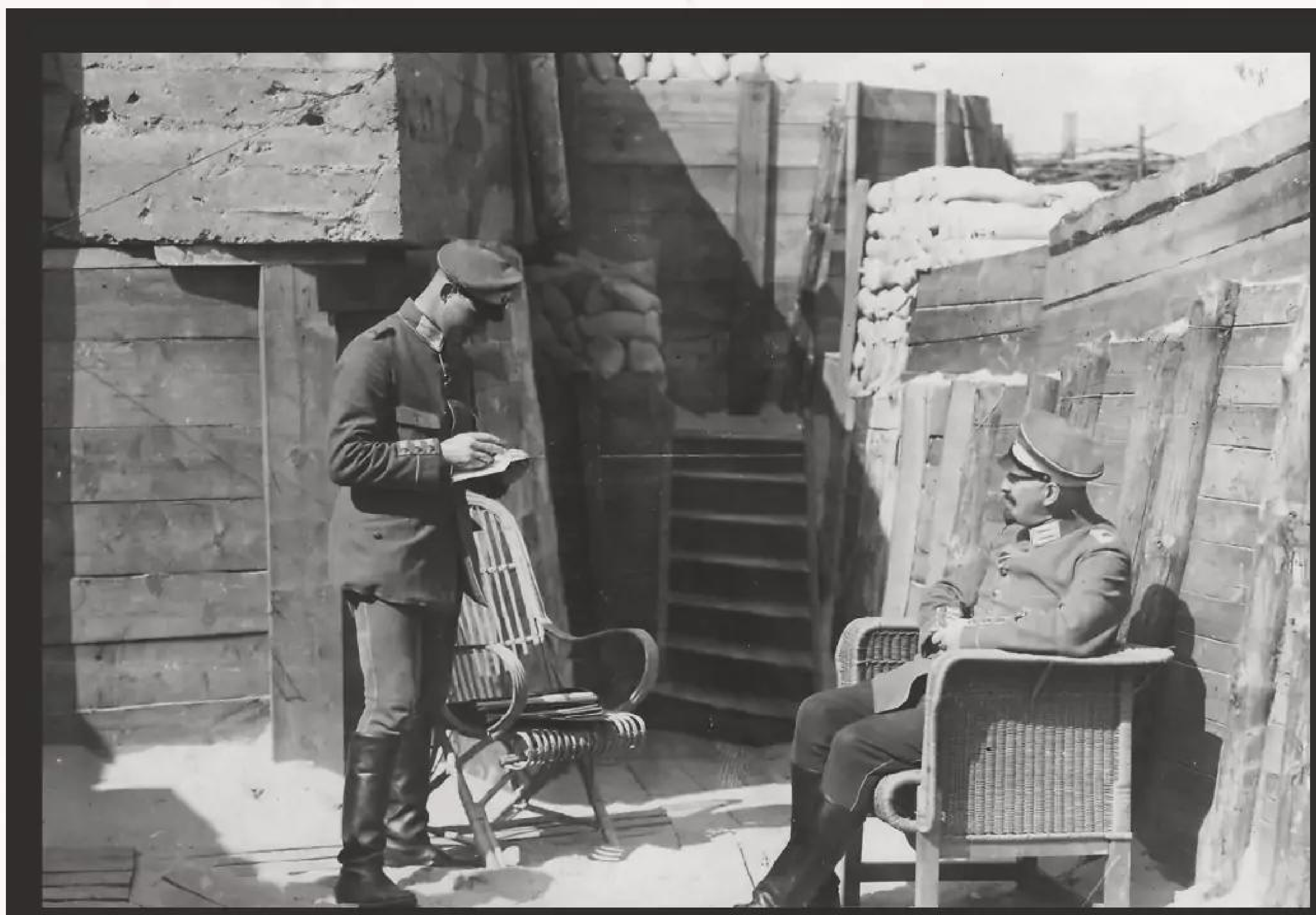
German defence tactics were about making the battle zone as deep as possible. Attackers had to take a series of trenches located several kilometres behind each other. The trenches also carefully followed the contours of the terrain.



MEANWHILE, IN FRANCE

FRENCH TROOPS WOULDN'T FIGHT

By the start of 1917, WWI had taken the lives of nearly a million French soldiers, equivalent to one in 20 of all men in the country. Nevertheless, General Robert Nivelle (right) continued to order new offensives with huge losses. On 3rd May, 1917 soldiers from the 2nd Colonial Division, veterans of the Battle of Verdun, had had enough. They turned up drunk and weaponless, refusing to obey orders – and the number of defections grew steadily. On 27th May, up to 30,000 French soldiers left the front in protest. The mutiny spread to 49 of France's 113 infantry divisions before army command intervened with mass arrests and military trials. 23,385 soldiers were convicted of mutiny: 554 were sentenced to death, but only 49 were shot.



BUNKER CONSTRUCTION: prior to the Battle of Passchendaele, both sides were arranged in relatively comfortable and well-developed trenches like this German position, where there was even room for wicker furniture.

Front. Which seemed encouraging as, by comparison, twice as many men had lost their lives or been invalided on the first day of the Battle of the Somme.

The next day, however, saw the worst rainfall in 30 years. The initial bombardment had destroyed drainage pipes, ditches and canals, so the battlefield quickly degenerated into a muddy swamp littered by millions of water-filled craters left by shells. The area taken by Haig's forces during the initial attack was now a logistical nightmare. Roads disappeared into the mud, even light artillery was left stranded and soldiers making their way to the front had to balance carefully on boards laid out over the mud. Often the soldiers carried packs weighing 45 kilograms, so they risked drowning if they slipped and fell into one of the numerous craters filled with mud or water.

The mud made it impossible for the Allies to build on the first day's success. The Germans had time to recuperate and strengthen their positions, and as the fighting continued, progress at the front was limited to heavy, shuffling steps. For the soldiers, life in the hell of the trenches had begun.

As the rain continued and increased, the trenches gradually filled with water to ankle or knee height. If soldiers didn't dry their feet, socks and boots regularly – often virtually impossible – they risked developing fungal infections on their feet.

1.5 billion shells were fired on the Western Front during World War I.

The dreaded "trench foot" led to blisters and open sores, which could lead to gangrene and ultimately amputation of a foot or even the whole leg.

"Your feet swell to two or three times their normal size and go completely dead", explained Sergeant Harry Roberts of the Lancashire Fusiliers after the war.

"You could stick a bayonet into them and not feel a thing. If you are fortunate enough not to lose your feet and the swelling begins to go down. It is then that the intolerable, indescribable agony begins. I have heard men cry and even scream with the pain".

RATS ATE THE FALLEN

Laundry, bathing and any personal hygiene was virtually impossible in the dirty underground corridors and rooms where the soldiers lived. US journalist Junius B Wood described to military newspaper *Stars and Stripes* how conditions in the trenches "would give hysterics to a sanitary housing expert":

"There is neither hot nor cold water, a basin of muddy water for shaving being the nearest one usually gets to washing one's face. Undressing usually consists of removing one's rubber boots and steel helmet for the few minutes one is able to sleep".

The filthy conditions gave free rein to disease. Soldiers with "trench mouth" were plagued by severe infections of the gums, which swelled up and filled with open, smelly ulcers. Millions were affected by "trench fever", a bacterial infection that caused skin lesions on the chest and back, undulating bouts of fever and joint pain and – in severe cases – heart failure. The disease was spread by the ubiquitous lice.

"There is no way to get rid of them permanently. No matter how often you bathe, and that is not very often, or how many times you change your underwear, your friends, the 'cooties' are always in evidence. The billets are infested with them", wrote American gunner Arthur Guy Empey in his memoirs.

Rats also spread disease and were feared almost as much as the enemy. Front-line

1917

18th July: as a prelude to the Third Battle of Ypres – the Battle of Passchendaele – Allied artillery fires 4.25 million shells into German positions. The bombardment is part of a planned major offensive, where British Field Marshal Douglas Haig hopes to destroy German U-boat bases on the coast. Submarines from here sink many Allied ships to threaten Britain's ability to continue the war in 1918. At the same time Haig is convinced that German morale is so low that its soldiers' fighting ability can be broken with a decisive thrust.

1917

31st July: the Battle of Passchendaele begins. British preliminary bombardment has probably weakened the Germans, but also given them warning an attack is coming. When the Allied offensive deploys over an almost 20-kilometre front, the Germans are well prepared and able to limit the Allied advance to relatively small areas. When heavy rain – the worst in 30 years – sets in the following day, the Allied advance is hampered by mud.

TRENCHES: as the Allies advanced, soldiers had to cope with bombed-out trenches and buried installations. German defenders hid in everything from ruined farms to burned tanks.

MUD HOLES: the battle's last phase in November saw soldiers duck down in shell craters for cover. Here Canadian soldiers set up a machine gun position in a crater in the middle of the mire.

soldiers were often woken from their scant sleep by a rat running across their face. Rodents thrived in the damp trenches, splashed around in the water underneath the makeshift floor boards and grew to incredible sizes. Some were as big as cats, inflated by the abundant food waste and – to the obvious disgust of the soldiers – by eating the fallen that had been left in no-man's land where it was impossible to recover them. The rats started with the eyes and continued from there until the fallen soldier had quickly been reduced to a skeleton.

Soldiers tried everything to get rid of the rats from kicking them to stabbing them with bayonets or even – despite being forbidden – by shooting them. But given that a single pair of rats can produce 900 offspring in a single year; that particular war was lost before it began.

The German trench axe could be used both for digging and as an offensive weapon.

SHELLS WERE IDENTIFIED BY THEIR SOUND

The insidious threat from rats, lice, viruses and bacteria was far from the soldiers' main concern in the mud of Passchendaele. Many newcomers to the front were killed by snipers on their first day in the trenches because they couldn't resist the temptation of peeking over the top of the trenches into no-man's land. The distance to the enemy's trench could be anything from 1 kilometre to less than 100 metres, and sometimes the soldiers could even hear conversations from the other side. When the enemy was so close, snipers were naturally devastatingly accurate.

The most active sectors were subject to incessant shelling, which meant that everyone was in constant danger from being killed indiscriminately from above. Whether a soldier sat in a trench or lay in one of the underground billets, he risked either being hit directly or being buried alive under the huge amounts of soil shell explosions sent into the air. It was a dangerous life on both sides of the front at Passchendaele, but the risk was probably greater for the advanced Allies who'd not had as much time to reinforce and secure their trenches in the way the Germans had.

Front-line soldiers quickly became experts in identifying shells exclusively by their sound. This also applied to the writer-turned-soldier Alfred Burrage:

"The brute that explodes with a crash like that of much crockery being broken, and afterwards makes a 'cheering' noise like the distant echoes of a football match, is a five-point-nine", he wrote before going on to describe the explosion of a German minenwerfer as like "the end of the world". The feared gas grenades sounded like "a woman with a hare-lip trying to whistle".

FIVE CENTIMETRES PER LIFE

On 16th August, the soldiers' lives in Passchendaele's trenches became even more precarious when the Allies launched a new offensive. Four days of fierce fighting resulted in only modest progress, and in September Haig switched both his tactics and second-in-command.

Haig's new man in the field was General Herbert Plumer, who gambled on winning a series of small victories rather than delivering a single, decisive blow. The new assault began on 20th September with the

1917

10th August: the Allies try to restart the offensive by moving towards the small town of Langemarck, but without much success.

1917

16th August: the British finally occupy Langemarck in a renewed offensive, but only after taking very heavy losses.

1917

20th September: after the rainy August, the weather in September is unusually dry. Mud slowly turns to dust, and it's now possible for the Allies to once again advance on the German positions. Field Marshal Haig replaces General Hubert Gough with General Herbert Plumer, who proved his worth at the Battle of Messines. Plumer initiates a series of smaller offensives, giving the Allies control of the ridge east of Ypres. The first advance occurs on the Menin Road on 20th September.

1917

26th September: Battle of Polygon Wood begins west of Ypres. 17,000 Allied soldiers and about as many Germans lose their lives. The British gain 900 metres.

1917

Battle of the Menin Road Ridge and was followed by two more offensives, which together gave the Allies control over the ridge east of Ypres. Progress was small, but gave Field Marshal Haig renewed faith in victory, and he decided to continue the offensive towards Passchendaele ridge, about 10 kilometres from Ypres – firm in his belief that the German Army was on the verge of collapse.

On the battlefield there was no sign of German weakness, however. Even the smallest advance took an almost unimaginable amount of effort, and fierce German counterattacks sapped at the morale of Allied soldiers. Boots disappeared into the slimy mud that sometimes came up to the thighs, and soldiers could only move slowly. Often only heroic individual efforts ensured the Allies made incremental progress. In total, one soldier's life was lost for every five centimetres the Allies managed to advance at the Battle of Passchendaele.

“MORNING HATE” GAVE SECURITY

Despite the horrible circumstances, life followed a fixed routine in the trenches. On the British side, the day began before dawn with the “stand to”, short for “stand ready for an attack”. Every man was expected to be ready with rifle loaded and bayonet fixed. The theory behind the call to arms was that an enemy attack was most likely under cover of darkness – either just before dawn or after twilight (when the stand to was repeated) – so both sides made sure to be well prepared for these moments. The Allies' stand to lasted half an hour, and in the morning at Passchendaele it was followed by a ritual among soldiers that became known simply as the “morning hate”. On both sides, soldiers released tension by firing machine guns and lobbing grenades into the morning mist ahead of him. This way, it added an extra layer of security to ensuring the front remained calm around dawn.

It was during one such ritual that Alfred Burrage, who continued to write fiction for magazines back home to support his family, received mail from his editors.

“One... used to write to me saying ‘Couldn't you let me have one of your light, charming love stories of country house life by next Thursday.’ I would get these letters in the trenches during the usual ‘morning hate’ when my fingers were too numb to hold a pencil, when I was worn out with work and sleeplessness, and when I was extremely doubtful if there ever would be another Thursday”.

THE WOUNDED STRIPE

British soldiers wounded in combat were allowed to sew a special distinction on their sleeve.

SOLDIERS WERE EXPECTED TO FIGHT ON MEAGRE RATIONS

After stand to, soldiers might be given a serving of rum before cleaning their rifles, ready for inspection by senior officers.

Then it was time for breakfast. Unofficially, breakfast meant a ceasefire, which was generally respected by both sides. Occasionally, the truce was interrupted when a senior officer heard about the gentleman's agreement and ordered soldiers to open fire on enemy lines.

> “Latrines gave off the kind of indescribable stench that veterans would always associate with the trench war”.

The soldiers' rations were theoretically excellent – particularly when compared to what many of the poorest among the soldiers had to settle for at home. British soldiers were, according to the official menu, to have daily rations of bread, cheese, butter, jam and tea, and there were either fresh vegetables or lime juice for scurvy, and tobacco and rum to keep the spirits up. Germans scraped by on a more basic daily menu of bread, biscuits, potatoes and vegetables – either fresh or dried. In addition, both sides could only be served meat after a break in the fighting allowed it to be delivered from field kitchens behind the front.

During the Battle of Passchendaele, the official menu was more wishful thinking than reality. Only carts hauled by horses and mules could ferry cargo through the mud, and although the transports took place at night, they were frequently shelled by the enemy who knew that they could easily scare the animals into running off the paved roads and into the muddy shell craters.

The hassle in delivering supplies meant soldiers on the front line could fight for several days without getting anything other than a small

1917

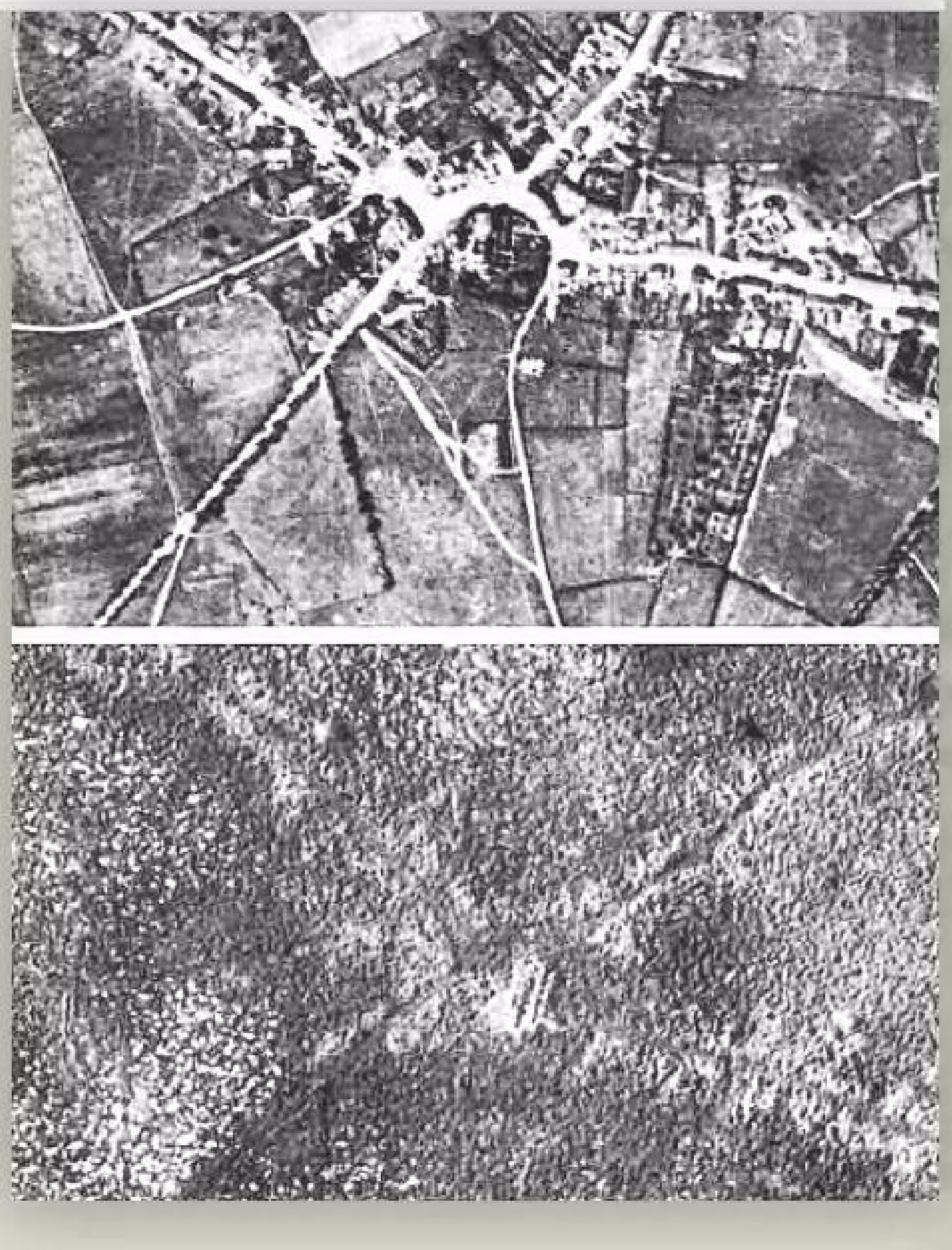
4th October: an offensive towards the small village of Broodseinde allows Brits to move 640 metres forward to secure control of a ridge south of Passchendaele.

1917

9th-12th October: encouraged by Plumer's results Haig decides to continue the offensive against Passchendaele ridge about 10 kilometres north-west of Ypres. Haig is now convinced that the German army is on the verge of collapse. Neither the battle for Poelcappelle on 9th October nor the first attack on Passchendaele on 12th October brings the Allies much closer to their goal. Meanwhile, the rain returns, and the Allies are now completely exhausted, while the Germans receive reinforcements released from the Eastern Front.

1917

6th November: Haig's major offensive has long been doomed, but he orders three more attacks on Passchendaele. Finally, on 6th November, the bombed village is captured (right) and Haig has his pretext to end the offensive. More than 300,000 Allied soldiers are dead without having managed to break through German lines. By the following spring the Allies will have given up the captured territory in a tactical withdrawal.



hunk of bread and could go several weeks between hot meals.

The food that managed to reach the front was often in deplorable condition – one New Zealand soldier noted how biscuits were distributed with what appeared to be thick patches of blood only to discover it was indeed blood: the food convoy had been hit by a grenade that had killed several horses and a transport officer.

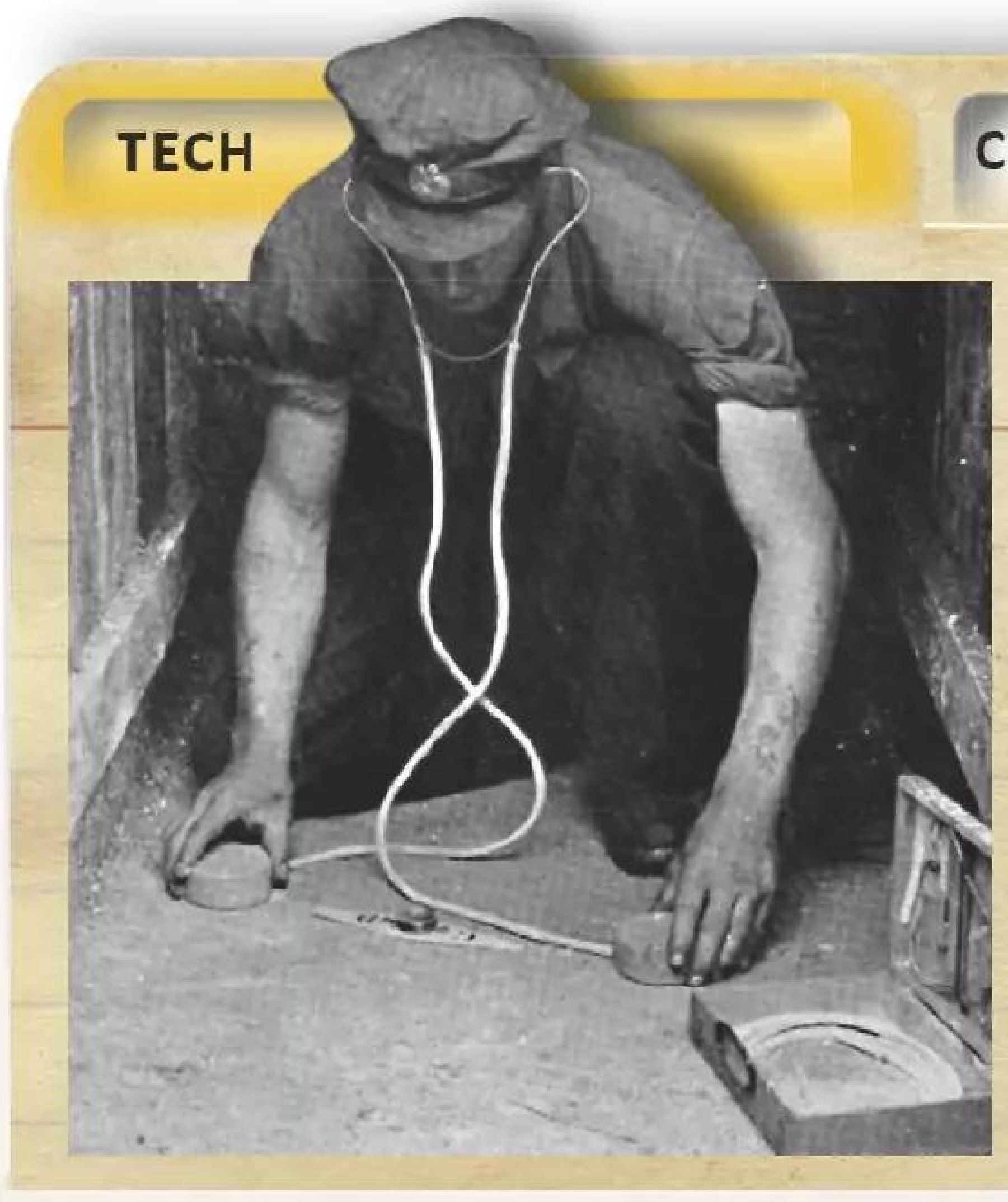
LATRINES CLOSEST TO THE ENEMY

After "morning hate" and breakfast, a soldier began his daily duties, which could consist of anything from refilling sandbags to repairing trench floorboards to drain water from the bottom of the trench. The trenches quickly filled with muddy water, particularly after heavy rain, which made life even more miserable for the soldiers and threatened to collapse the trench walls.

One specific task was detested more than any other: sanitation servicing. The smelly work was therefore handed out as punishment for soldiers who violated regulations. Each company typically tasked two men with the hated job of keeping the latrines in good order. Field toilets consisted of holes in the ground one or two metres deep, or even just buckets or biscuit tins. Sometimes the soldiers simply used the holes left behind by enemy shells.

As a rule, latrines lay behind the front line, but they often lay in front of the forward trenches when on the move – allegedly to dissuade soldiers from taking time to relieve themselves. In reality, however, there was little risk: the latrines gave off the kind of indescribable stench that veterans would always associate with the trench war. In addition, there was the risk that enemy troops would discover increased activity around the toilets and launch an artillery attack.

TECH CULTURE ECONOMY EVERYDAY



Tunnel folk listened to the enemy

Both the Germans and Allies dug tunnels to place mines under each other's positions. To locate the enemy, tunnellers utilised so-called geophones, which consisted of a pair of wooden discs that encased a layer of mercury between mica plates, connected by tube to a pair of headphones. Tunnellers were then able to determine which direction the sound came from by moving one plate in an arc around the other until the sound in question could be heard with equal intensity in both ears.

LETTERS TO THOSE AT HOME

A soldier's freedom of movement in the trenches was – in general – extremely

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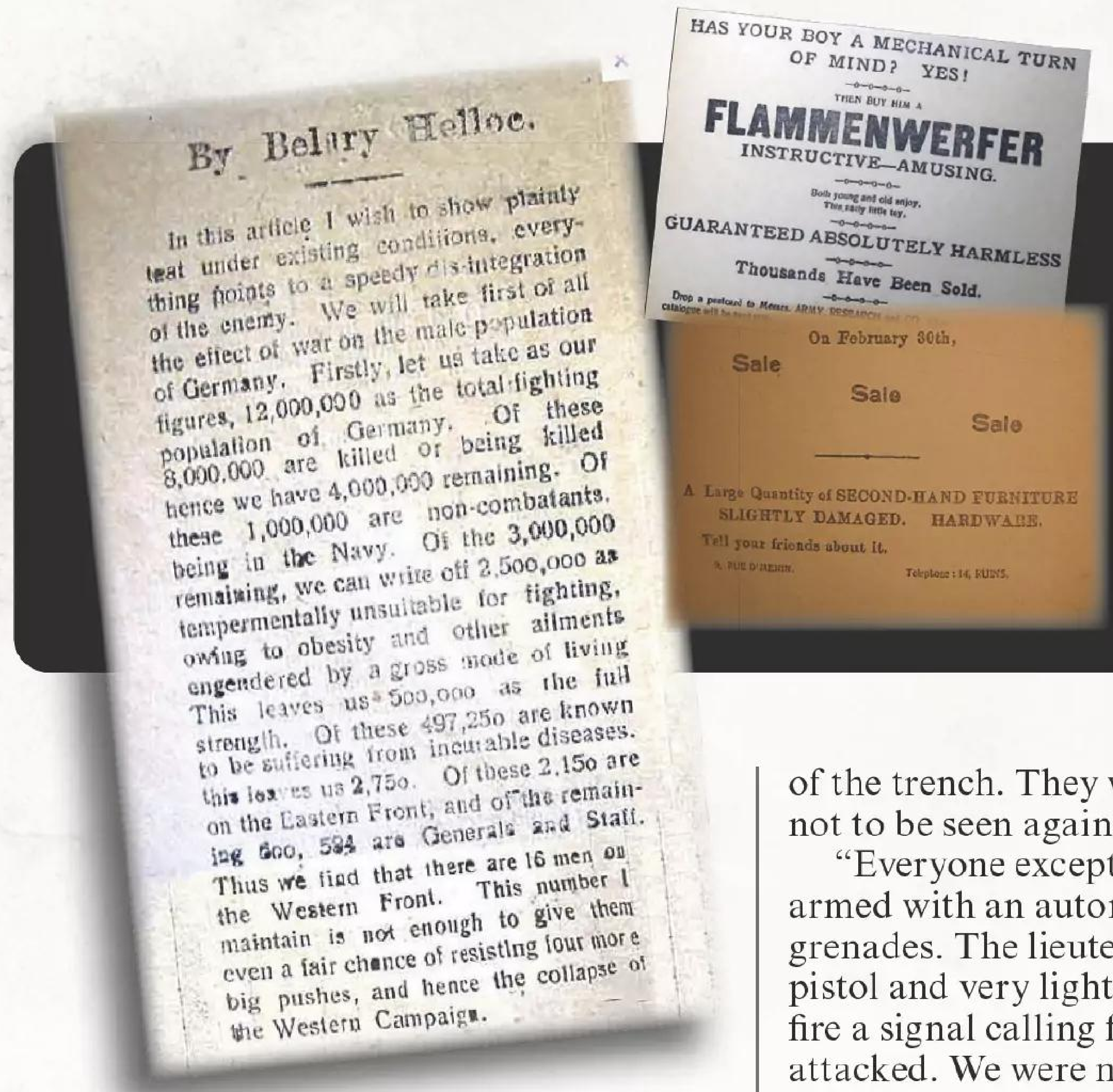
Captured Germans were sent to help carry wounded Allied soldiers through the mud.



By Belary Helloc.

In this article I wish to show plainty
teat under existing conditions, every-
thing points to a speedy dis-integration
of the enemy. We will take first of all
the effect of war on the male population
of Germany. Firstly, let us take as our
figures, 12,000,000 as the total fighting
population of Germany. Of these
8,000,000 are killed or being killed
hence we have 4,000,000 remaining. Of
these 1,000,000 are non-combatants,
being in the Navy. Of the 3,000,000
remaining, we can write off 2,500,000 as
tempermentally unsuitable for fighting,
owing to obesity and other ailments
engendered by a gross mode of living
This leaves us 500,000 as the full
strength. Of these 497,250 are known
to be suffering from incurable diseases.
this leaves us 2,750. Of these 2,150 are
on the Eastern Front, and of the remain-
ing 600, 584 are Generals and Staff.
Thus we find that there are 16 men on
the Western Front. This number I
maintain is not enough to give them
even a fair chance of resisting four more
big pushes, and hence the collapse of
the Western Campaign.

HAS YOUR BOY A MECHANICAL TURN
OF MIND? YES!

THEN BUY HIM A
FLAMMENWERFER
INSTRUCTIVE—AMUSING.

Both young and old enjoy.
This jolly little toy.

GUARANTEED ABSOLUTELY HARMLESS

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SLIGHTLY DAMAGED. HARDWARE.

Tell your friends about It.

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SOLDIERS PUBLISHED MAGAZINE

In 1916, British soldiers at the front at Ypres captured a printing press. Before long they'd started to publish *The Wipers Times*, a magazine named after the soldiers' failed attempts to pronounce "Ypres". Soldier writers used the magazine columns to poke fun at the over-optimistic propaganda material they were fed as well as invent fake letters and ads – for example: "Sale: A large quantity of SECOND-HAND FURNITURE SLIGHTLY DAMAGED". The gallows humour magazine was published at irregular intervals right up to 1918.

limited during the day. Sniper fire and watchmen constantly monitored the front line and fired shots at any sign of movement. When they weren't on duty, exhausted soldiers took the opportunity to catch up on some sleep or write letters to family and friends back home.

West Yorkshireman Leonard Jackson, aged 28, wrote to his wife Minnie once he'd returned to the front after being wounded in the leg:

"Do not be afraid Kiddie, when you see there has been severe fighting. It does not follow that we are in it you know. I am glad to hear everybody are well, and pleased that you gave my little girlies enjoyment at the pictures. They would be delighted I am sure. And I would not mind giving you a lift with them. I think I would carry Ruby any distance. Am just about used to walking now".

The letter was written a few days before Jackson's death on 26th September, 1917. In addition to his wife, he left behind three girls aged six, four and two. There is no grave for him because he was blown to pieces in the explosion from a shell.

MEETING IN LIMBO

In the evening, as darkness descended upon Passchendaele's mud bath, activity increased in the trenches again. Men were dispatched for supplies, while others took up their position in the day's second stand to.

At night it was also time for expeditions into no-man's land. Patrols were sent out to repair barbed wire fences and the like, while others were sent to eavesdrop on the enemy.

American journalist Junius B Wood participated in one such night raid, and described to his newspaper readers back home how – under cover of darkness – a small group of men climbed carefully up and over the edge of the trench. They went one at a time, so as not to be seen against the skyline:

"Everyone except the lieutenant was armed with an automatic revolver and four grenades. The lieutenant carried a rocket pistol and very light cartridges, ready to fire a signal calling for a barrage if we were attacked. We were not insured against a failure to return, but it was some satisfaction to know that a bank of batteries was standing on a hill behind us ready to hurl several thousand dollars worth of shells if the Germans shot at any of us".

Sometimes it happened that patrols from different sides met in no-man's land. In such situations soldiers had to choose between scurrying away in opposite directions or fighting with fists and bayonets. No one could risk firing their weapons, since it would inevitably attract shelling, which would be fatal to all.

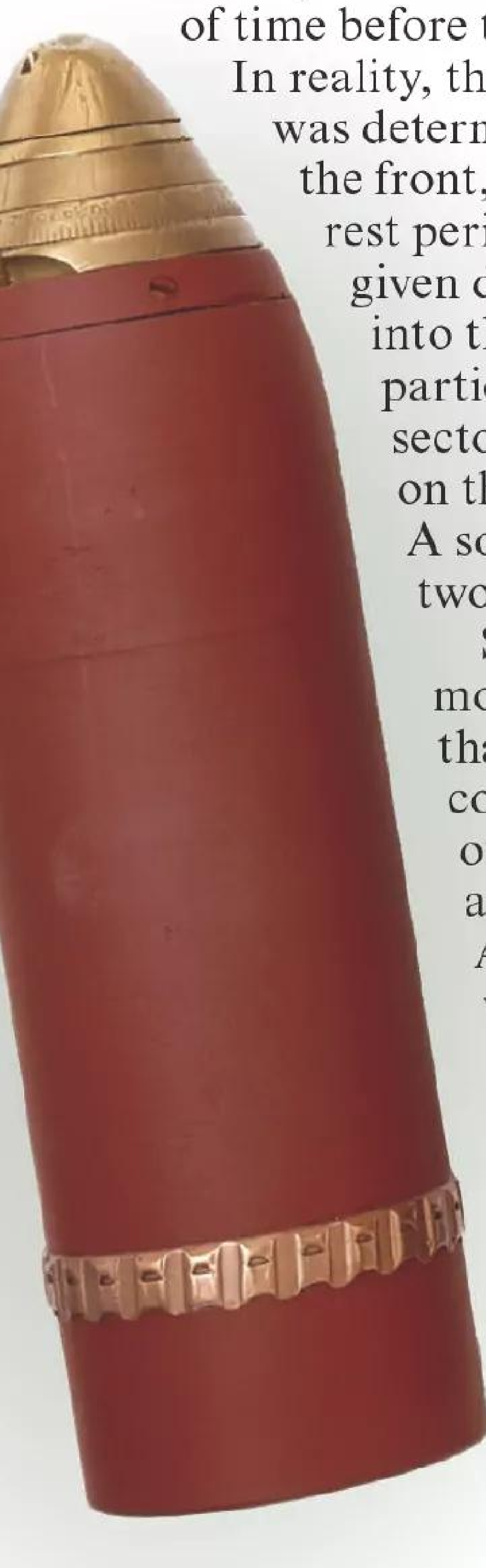
TWO WEEKS OF LEAVE PER YEAR

Night was also when both armies would swap out the troops in the front line. Typically, a battalion spent a while on the front line, then moved to the support section just behind before moving out to the reserve lines, where it was typically quieter before they finally got the chance to rest away from the front for a short period of time before the cycle began again.

In reality, the length of each period was determined by the situation at the front, and even in so-called rest periods, soldiers risked being given duties that brought them into the firing line. Others, particularly those in busy sectors, spent much more time on the front than proscribed. A soldier could only count on two weeks leave each year.

Soldiers coveted leave more than anything other than final repatriation, but connecting to the world outside of the trenches was a mixed blessing for many. Author Alfred Burrage was first given leave after more than a year of service, where he found little support among civilians.

"The old gentlemen who had given their sons were still extremely patronising. You see, I hadn't any to give. The younger men who had not seen active service or, for various reasons, any service at all, were rather irritating. Most of them tried to imply that they had been having just as rough a time as the men in the trenches, and talked about air-raids and the bomb which had fallen only three-quarters of a mile away", said Burrage.



Soldiers gradually learned to distinguish different shell types from each other solely by their sound.

BUTCHER HAIG

After three and a half months, on 6th November, 1917, the gruelling offensive finally attained its goal, as the Allies succeeded in occupying the hills west of Ypres, where Passchendaele lay. The strategic gain was negligible, but the capture of the small village gave Haig an excuse to finally bring the offensive to a halt under the pretext that its objectives had now been met.

All plans to occupy the ports hosting German submarines on the coast had to be abandoned, and not long after, only a few months later, in spring 1918, a strategic retreat saw the Allies give up the territory they'd painstakingly won.

It's since been debated whether Haig was brilliant or insane. The fact is that two million British soldiers died or were injured under his command – a statistic that gave him the nickname "Butcher Haig".

SOLDIERS HAD NEW OUTLOOK ON LIFE

Regardless of Haig's strategic skills – or lack thereof, the millions of young men he exposed to trench warfare found their outlook on life changed forever.

Burrage later recorded how the war had noteably changed soldiers' perceptions on life:

"We discuss the chances of getting back to England not too painfully wounded. After the war we arrange to meet at a little pub in Epping Forest… and get gloriously zig-zag while discussing these bad old times", he wrote.

"That's all we ask of the future – just safety, just comfort and enough to eat and drink. If only we can come through alive we will never, never grumble at the petty annoyances of life which civilians know no better than to call misfortunes and even tragedies". ■

Death was ever-present at Passchendaele.

THE AIR WAR'S INFANCY

1914-1916

At the beginning of World War I, pilots had no experience to draw on, as the fragile and vulnerable planes were history's first to fight air duels. But both aircraft technology and pilots' tactics developed at a furious pace. Isolated attacks with small arms and missiles developed over a few years to coordinated raids with groups of specially developed fighters with rasping machine guns.

1914-16

1914: aircraft are used in war for the first time.

1914: the first real fighter, the British FB5, comes into service.

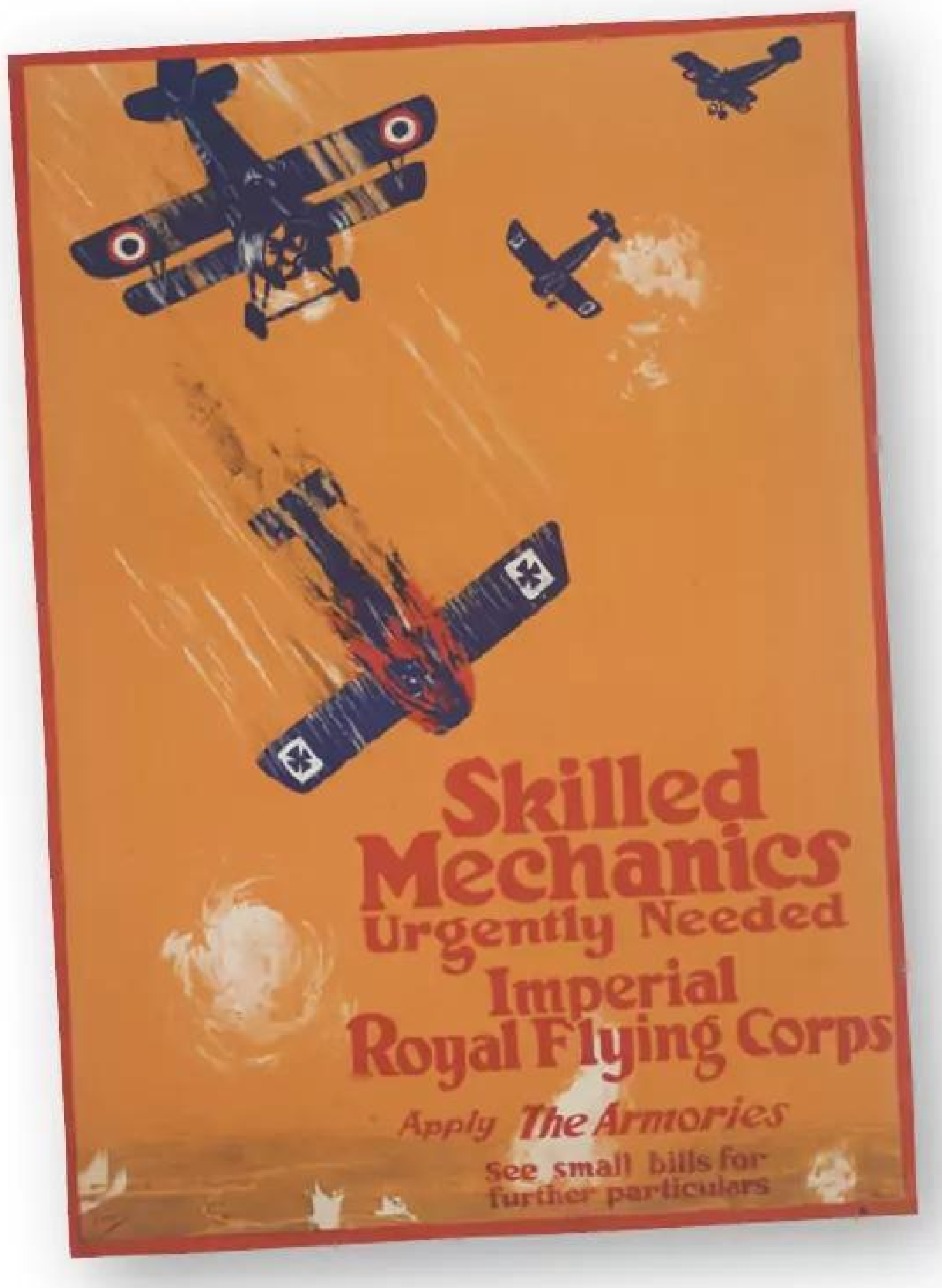
1915: the first synchronised machine guns make it possible to shoot ahead.

1915-16: German Fokker Eindecker dominates the skies under the Fokker Scourge.

1916: German ace Oswald Bölcke formalises an air combat manual: the Dicta Bölcke.

1916: Bölcke dies, but his air-attack tactics still live on.

1914 1915 1916



The air war created a need for skilled mechanics.

Lanoe Hawker turned his gun towards the German reconnaissance planes hovering just above his own Bristol Scout machine, and pulled the trigger. The bullets had no apparent effect on the enemy plane as it continued its journey unfazed across the battlefields of the Western Front. Resolutely the British pilot gripped his observer's rifle and fired it at his German opponent.

"We didn't down the beggars, but put the wind up them, spoilt their reconnaissance… and drove them ingloriously to earth", Hawker wrote in March, 1915.

Six months earlier World War I broke out, and for the first time, aircraft were included as an essential part of warfare. The pilots started completely from scratch when it came to tactics and air combat techniques. The invention of the plane was so new that the war's airmen could neither get guidance from books nor by asking experienced colleagues. They had to try things out and learn everything from scratch.

PILOTS DROPPED BRICKS ON ENEMY

Early pilots tried to intimidate their opponents by diving down dramatically on their planes, forcing them to land. Other times they fired guns and threw grenades or bags of bricks onto an enemy plane in the hope of knocking a hole in its wings. In rare cases air warriors even swung a cable with a tie or lead weight at the end from their planes, hoping that it would become entangled and destroy the opponent's propeller. One September day in 1914 in an air battle, Russian pilot Pyotr Nesterov deliberately flew into and thereby destroyed a German Albatros, which had attacked his base on the Eastern Front. Both Nesterov and the crew of the Albatros died in the mad attack.

A hand pump operated several times an hour by the pilot provided some of the first fighter aircraft engines with fuel.

BULLETS RESULTED IN NEAR-MISS

At the beginning of World War I dramatic duels between aircraft were only a small part of the pilots' lives. A selection of Lanoe Hawker's experiences during April 1915 reveal the tasks combat pilots performed, and what dangers lurked for them in the air. On one of his missions the British pilot dropped primitive bombs and hand grenades onto a hangar full of German Zeppelin airships. The last of the bomb drops sent him towards a storm of fierce enemy bullets from just 60 metres away. Some days later he led a reconnaissance flight and took on 50 bullet holes. One shot grazed the propeller, another grazed a strut, a third went through the exhaust, and a fourth hit Hawker's legs.

"I hobble about with the aid of a stick and fortunately it does not stop my flying", Hawker said later about the incident. He began to take a gun with him on the plane, so he could shoot back. In June Hawker took things a step further and mounted a machine gun on one side of his Bristol Scout plane. Although he could not shoot straight ahead because of the propeller, the weapon gave Hawker new opportunities. Now the British pilot could dive at almost 200 km/h towards the enemy while shooting at him.

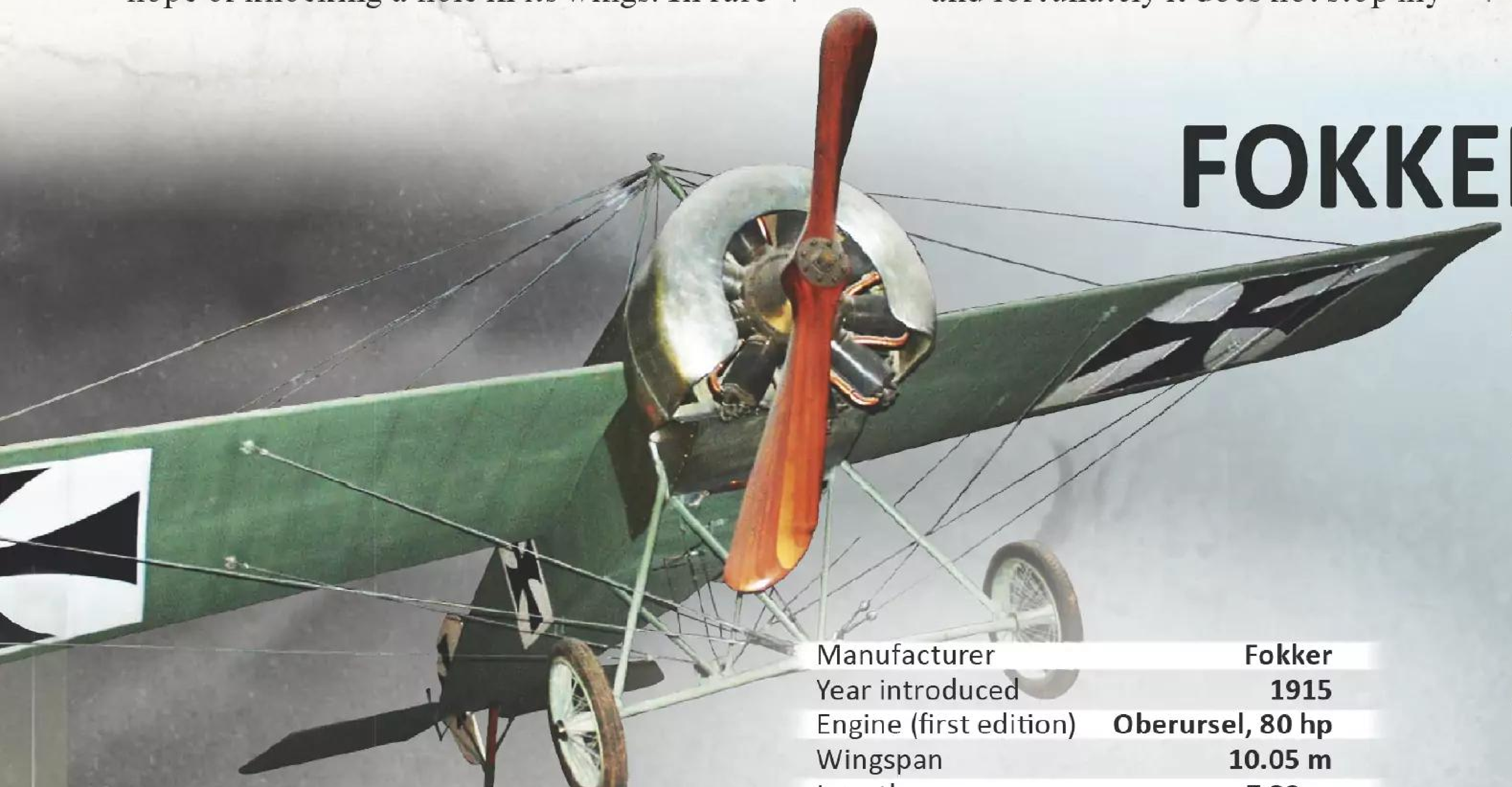
On 1st August, 1915 Hawker described in a letter how his new attack technique took down a German aircraft at Ypres in Flanders. The Briton came completely unnoticed beside the enemy pilot and opened fire from some 30 metres.

"He burst into flames and crashed in our lines. I felt very sorry for him when he fell in flames, but war is war and they have been very troublesome of late", commented Hawker drily.

WAR HELPED AIRCRAFT DEVELOPMENT

The invention of the aircraft was only a few years old when World War I broke out. In 1903, two American brothers Orville and

FOKKER EINDECKER



Manufacturer	**Fokker**
Year introduced	**1915**
Engine (first edition)	**Oberursel, 80 hp**
Wingspan	**10.05 m**
Length	**7.20 m**
Top speed	**about 130 km/h**
Armament	**LMG 08 machine gun**

RECONNAISSANCE WAS A KILLER

■ Originally the Fokker-made Eindecker was conceived as an unarmed surveillance aircraft, but it became an effective fighter after being fitted with a new, synchronised machine gun. The synchronising mechanism ensured that the pilot could shoot without the risk of hitting the propeller, so he could easily steer, aim and shoot at the same time. The synchronised gun gave an advantage over aircraft where arming sat on the side of the plane or on top of a double-wing.

■ **GREATEST STRENGTH:** the synchronised machine gun was superior for surprise attacks.

■ **GREATEST WEAKNESS:** poor roll response due to the use of wing warping rather than ailerons, making it slow in close combat.

Wilbur Wright were the first in the world to fly in a plane that was heavier than air, and only three years later powered flight was achieved in Europe too.

The Wright Brothers' first flight lasted 12 seconds and spanned about 35 metres and 4.5 metres altitude, but by the outbreak of war just 11 years later new planes could stay in the air for hours at a time and fly at an altitude of up to six kilometres. During World War I flight developed further because it was now focused on constantly outdoing the opponent in both speed and mobility.

At the beginning of the war bombs were thrown by hand.

General believed horses were better than planes

At the beginning of the war a pilot's primary task was reconnaissance, observation, aerial photography and directing artillery fire. Air reconnaissance became one of the most important tasks for the pilots, although in the years preceding World War I confidence in the aircraft's efforts in this area was not high among senior military personnel. As recently as a month before the war British Lieutenant General Douglas Haig said to a military assembly:

"I hope none of you gentlemen is so foolish as to think that aeroplanes will be able to be usefully employed for reconnaissance purposes in the air. There is only one way for a commander to get information by reconnaissance, and that is by use of cavalry".

The general's prediction did not prove to be true. Along with observation balloons, planes quickly outperformed cavalry and took over reconnaissance tasks. From the air, pilots could identify new enemy activity, such as troop movements on the roads and railways, construction of new fortifications and supply depots or an array of artillery units.

Also, during battles the planes played a significant role, since the pilots could keep army officers at headquarters up to date with progress on the battlefield – for example, by Morse messages directly from the air. The planes swarmed over all battlefields from the outbreak of war in 1914 – putting pilots' lives at stake.

Planes stood upwind

The aircraft that were first sent into the air above World War I battlefields were flimsy constructions of wood, canvas and wires – or just a bare hull of ribs and battens – equipped with clattering engines, and stinking of oil. Quickly the primitive aircraft started to perform tasks that tested aircraft designers, pilots and the machines to the limit.

One day in the autumn of 1914, British pilot Denys Corbett Wilson was planning a reconnaissance of the battlefields on the Western Front. But loaded with a 90 kg observer, full fuel tanks, rifles and ammunition the plane was too heavy to take off. The ground's bad surface and a strong crosswind did not make things any easier, and eventually Wilson had to give up: "The tail went down, the plane stopped and dropped down on one wing", the pilot reported.

His primitive machine was strongly influenced by the weather and wind. The wood saturated when it got damp and it could be hard to move forward in the case of strong headwinds: "Took 50

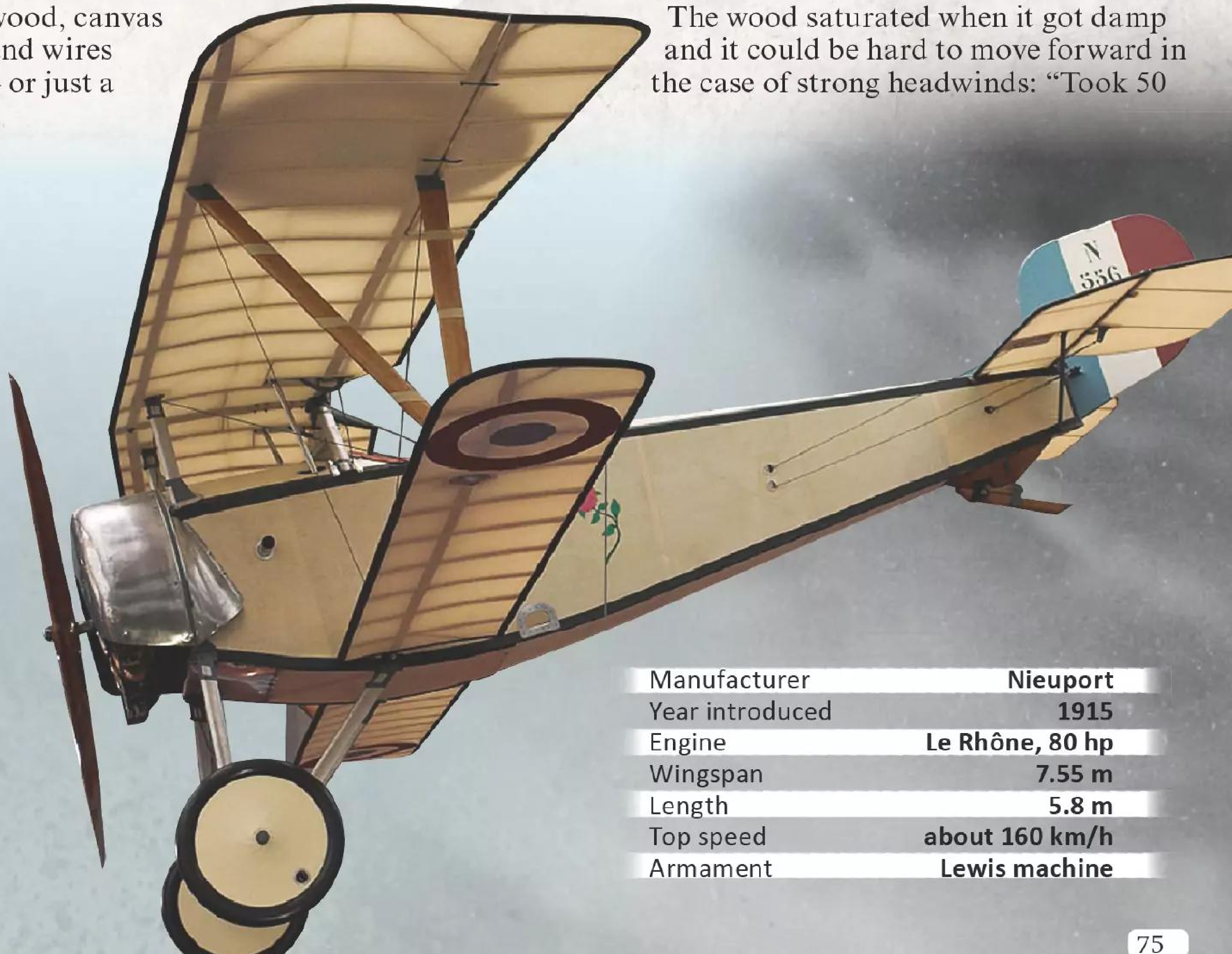
NIEUPORT 11

"BÉBÉ" WAS SUPERIOR TO GERMAN AIRCRAFT

■ The Frenchmen's new biplane quickly got the nickname "Bébé" (baby) because of its small size. The model was the first French aircraft built exclusively as a fighter, and "Bébé" came to the Allies' rescue at the right time. For a long time, the German Fokker Eindecker had controlled air over the French and Belgian trenches, but with the new French aircraft the Allies had a machine that was Eindecker's superior in both speed and manoeuvrability.

■ **GREATEST STRENGTH:** lightness, a powerful engine and superior aileron manoeuvrability.

■ **GREATEST WEAKNESS:** too small to carry heavy weapons and lacked a machine gun that could shoot through the propeller.



Manufacturer	**Nieuport**
Year introduced	**1915**
Engine	**Le Rhône, 80 hp**
Wingspan	**7.55 m**
Length	**5.8 m**
Top speed	**about 160 km/h**
Armament	**Lewis machine**

> “A volley of bullets sprayed in the direction of the Germans”

minutes to do 20 miles coming home, and that very low. At 900 metres, I was standing still”, recounted Corbett Wilson.

Other British pilots in the war's first months mounted a Lewis machine gun on their flights and learned that the weapon was so heavy that they could not fly any higher than 600-1,000 metres. Meanwhile, German observation planes could operate safely about half a kilometre above the British. Therefore, more squadron leaders forbade their pilots to equip the planes with machine guns – reconnaissance was the primary task, and it basically required the pilot and observer were unarmed.

Engineers toiled with rifles

On 5th October, 1914, something conclusive happened. That day, a French Voisin shot an enemy plane down with a machine gun for the first time. The incident ushered in a new period in air war, when there was increasing focus on dogfights and thus the need to build actual fighters to shoot down other aircraft.

An urgent task for aircraft engineers was to now develop planes with an integrated and uncomplicated armament, so pilots would not have to sit and wave a loose rifle around during attacks.

The pusher configuration, where engine and propeller sat behind the pilot, offered a solution. With the gear mechanism at the back, crew had unrestricted forward visibility and the ability to shoot 180 degrees without the propeller getting in the way. Britain's first fighter was a two-seat pusher, the Vickers FB5 where FB stood for “Fighting Biplane”. In the plane's nose sat a Lewis machine gun with an unobstructed firing line straight ahead, and the aircraft debuted at the front in December 1914.

The FB5, and especially later pushers, distinguished themselves as fighter planes – not least the highly manoeuvrable DH2, which was equipped with ailerons and was thus much faster at turning than its German counterparts.

The pusher aircraft was far from trouble-free. The engine's high mounting meant the rear view was blocked and the pilot could therefore be easily surprised by attacks from behind. Moreover, the DH2 – despite a good climb speed – was slower than some German machines because of its greater air resistance, and it had difficulty getting up to speed, even during long dives.

The problems with pusher planes meant that most aircraft were still being made with the propeller positioned in front of the pilot.

The air pressure gauge was first seated in a plane flown by Gervais Raoul Lufbery.

Pilots experimented wildly

While engineers tried to find a solution to enable pilots to shoot straight from their front-propelled planes, pilots experimented with mounting machine guns so they could both defend themselves and bring down enemy aircraft.

Some pilots placed the machine gun slightly tilted relative to the propeller, so it wouldn't be hit. The dexterous and inventive Lanoe Hawker invented a bracket to ensure that the weapon could sit on the side of the plane and still face forward. But although Hawker was good at using his invention, it was generally difficult for pilots to aim the gun from the side of the plane. The pilot could not, for example fly directly toward the target if he also had to shoot at it – instead he had to correct his machine slightly to the left or right relative to the enemy aircraft.

To shoot, some pilots even mounted their machine gun on the top wing of their biplane, so the shots went over the propeller. This location was not without difficulties, as the pilot had to stand and place the control stick between his legs when he changed the ammunition drum.

French killer weapons led to victories

One spring morning in 1915 French pilot Roland Garros was ready to test a new weapon in his Morane-Saulnier aircraft. Initially, it looked like an uneven battle when the Frenchman took on four German Albatros on the Flanders battlefields with no support. But Garros continued targeting the German reconnaissance aircraft and showed no signs of wanting to escape.

Suddenly a little yellow flame jumped out of a machine gun, sitting just behind the propeller on the French plane, and a volley of bullets sprayed in the direction of the Germans.

With one quick move, the air battle had changed radically: never before had a pilot fired a machine gun through the rotating propeller blades – that is, in a straight line in front of him. A specially developed mechanism ensured that the bullets did not hit the propeller, and with his innovative, synchronised machine gun control Garros could aim and shoot at the same time. He was, in other words just pointing his plane in the

Careers were often short for World War I pilots.

THE GREATEST FLYING ACES

To achieve the designation "ace" a pilot usually had to achieve five victories. On all sides of the fronts daring young men achieved the title.

"LONE WOLF" STRENGTHENED MORALE

With a machine gun on the top wing Ball pounded his enemies from below.

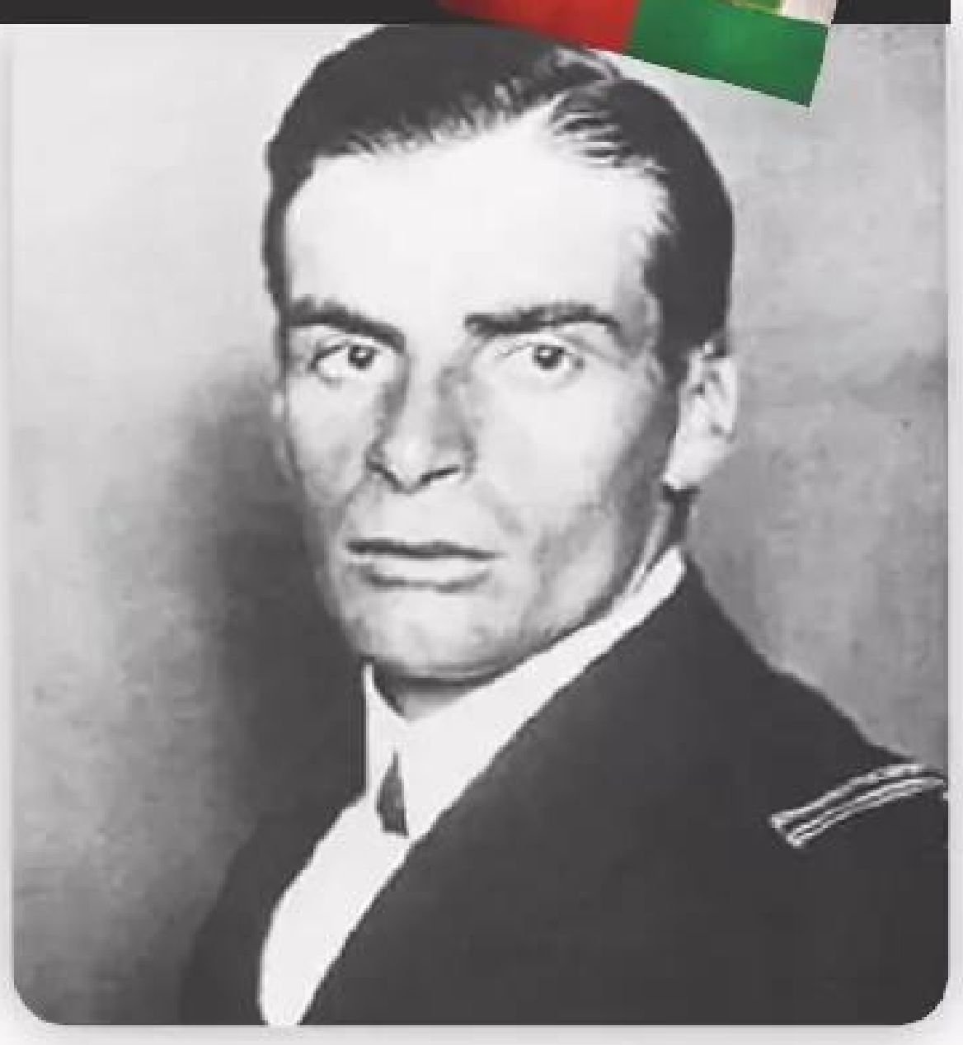
■ Albert Ball,
18th August, 1896 – 7th May, 1917

■ 19-year-old Albert Ball took part in his first air battles in northern France in the spring of 1916. With 44 victories the following year he had a great impact on the faltering morale in the British air forces, and he became a hero in Britain. Ball belonged to the category of "lone wolves" who liked to hunt alone. Ball developed a tactic where he plunged toward a formation of enemy planes to surprise them. Then he focused on one machine, staying close and pounding it with his machine gun.

MASTER PILOT ATTACKS SEAPLANE

■ Gottfried Banfield, 6th February, 1890 – 23rd September, 1986

■ In the winter of 1916-17 a spectacular air battle played out over the Isonzo front in northern Italy: in bad weather, an Austro-Hungarian seaplane fought an Italian Nieuport fighter with a rampant horse on its side. Two great flying aces met – Austro-Hungarian Gottfried Banfield and Italian Francesco Baracca. The duel ended in a draw, but Banfield scored a total of 18 victories in his Lohner L-seaplane including an attack on Venice, targeting airships, military bases and observation balloons.



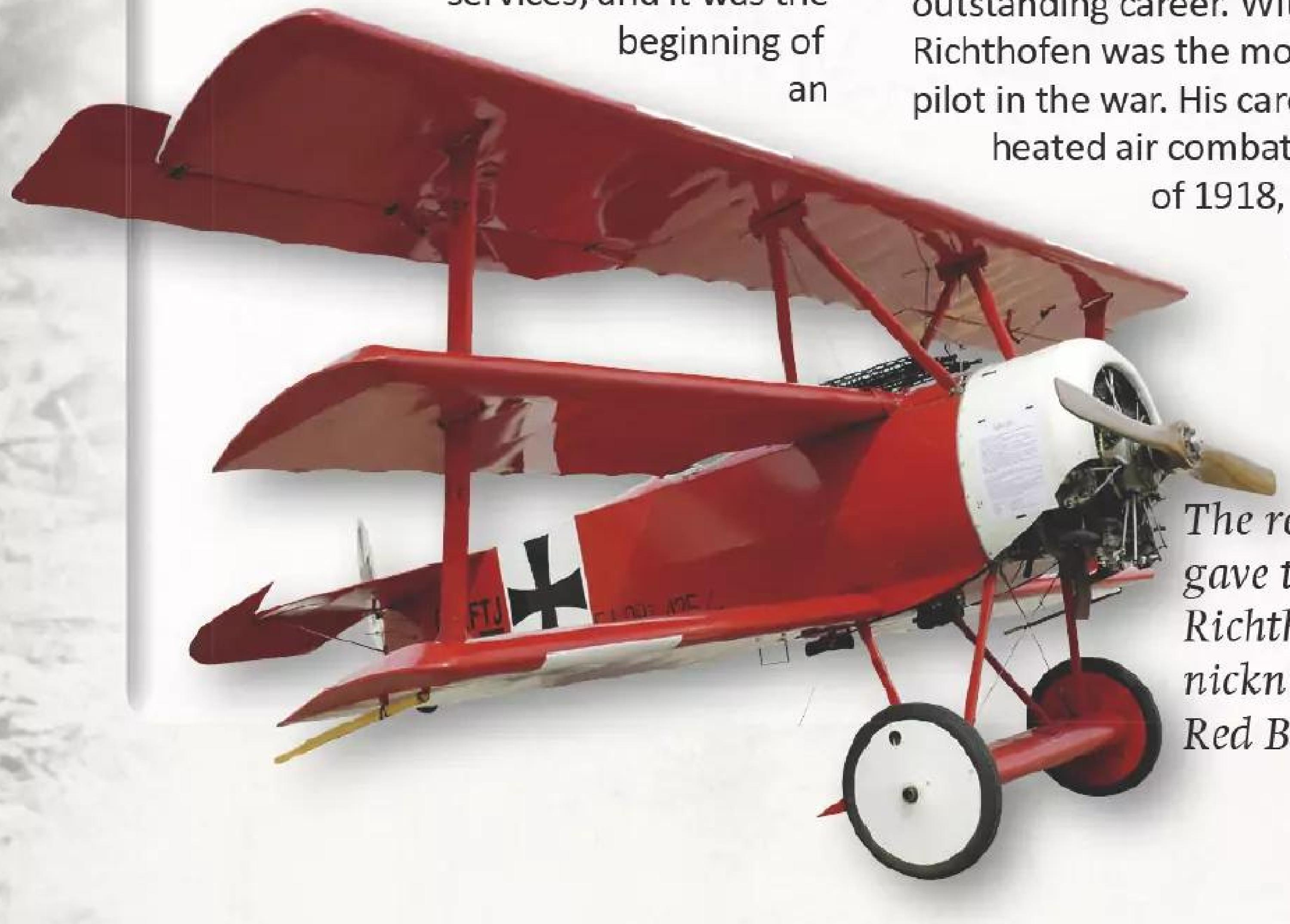
Banfield started his pilot's career in the navy in 1912.

RED BARON BEGAN ON HORSEBACK

■ Manfred Freiherr von Richthofen,
2nd May 1892 – 21st April 1918

■ Young Lieutenant Manfred von Richthofen was frustrated in the autumn of 1914. There was stalemate on the Western Front in the trenches, and as a cavalryman on the front he was bored. The cavalry's days were numbered, and the future of a hard-working officer lay elsewhere. In 1915 Richthofen volunteered for the German air services, and it was the beginning of an outstanding career. With 80 victories Richthofen was the most successful pilot in the war. His career ended in a heated air combat in the spring of 1918, when an Australian pilot hit the German ace.

Red Baron in a quiet moment with his dog Moritz.



The red plane gave the noble Richthofen his nickname the Red Baron.

MECHANIC WAS AN AVIATOR

■ Gervais Raoul Lufbery,
14th March, 1885 – 19th May, 1918

■ French- American Gervais Lufbery launched his air career as a mechanic for a French pilot in 1914, and in October 1915 served as a bomber pilot on the French side. The following year he switched to the newly created Escadrille Americaine, which mainly consisted of volunteer American fighter pilots, where he distinguished himself quickly with more victories. When the United States entered the war, Lufbery carried on winning as the head of an American squadron, but on Sunday, 19th May, 1918 after 16 victories his luck ran out: during a fight with a German Rumpler fly, Lufbery's machine caught fire. The pilot struggled for life in a cockpit engulfed in flames, and when they failed to extinguish the fire, he crawled out trying to keep control of the machine, as he sat astride its frame. Then the French-American pilot either jumped or fell the from the machine. He landed in a garden in the village of Maron in north-eastern France and died immediately.

Lufbery volunteered as a pilot to avenge his friend Marc Pourpe's death. Lufbery had originally been Pourpe's mechanic.

BALLOON HUNTER WANTED REVENGE

■ Léon Bourjade, 25th May, 1889 – 22nd October, 1924

■ With a small French flag fluttering from the headrest of his Nieuport on 27th March, 1918 Léon Jean-Pierre Bourjade dived down towards a German observation balloon as he fired his machine gun. When the Frenchman subsequently pulled the plane up in a flurry of bullets and grenades, he could see that he had finally managed to shoot a balloon into flames. It was not the last time. With 27 victories in total, Bourjade and the French pilots shot down many observation balloons during the war. The balloons directed artillery fire and monitored enemy troop movements, and they were important military targets. As an artilleryman Bourjade had spent two years in the trenches under barrages directed by artillery balloons and by his own admission he volunteered as a pilot for revenge.

27 of Bourjade's 28 victories were over observation balloons behind enemy lines. He died in 1924.

> “The two corpses were exposed in a horrible state — so naked and bloody!”

A beautiful curved propeller from a Sopwith Camel.

direction of the enemy and then pulling the trigger.

The Frenchman's weapon quickly showed its fearsome efficiency. One Albatros went into a spin and crashed to the ground, engulfed in flames and killing both pilot and observer. Horrified and confused the other German pilots quickly dived and fled home to their base.

Garros was left scarred by the violent and deadly effect he had caused.

“It was tragic, terrible. After a half-minute fall that seemed like a very long time, it began its death spin trailing a plume of black smoke. I went up by autocar to view wreck... The two corpses were exposed in a horrible state— so naked and bloody! The observer shot through the head, the pilot too horribly mutilated to be examined. The plane, what was left of it, was everywhere pierced by bullet holes”.

The terrifying vision did not stop Garros from exploiting his new weapon. In the following weeks he shot down several German planes, but on 18th April, he was forced down in enemy territory, where the Germans captured his plane along with the secret machine gun.

Fokker plagued the Allies

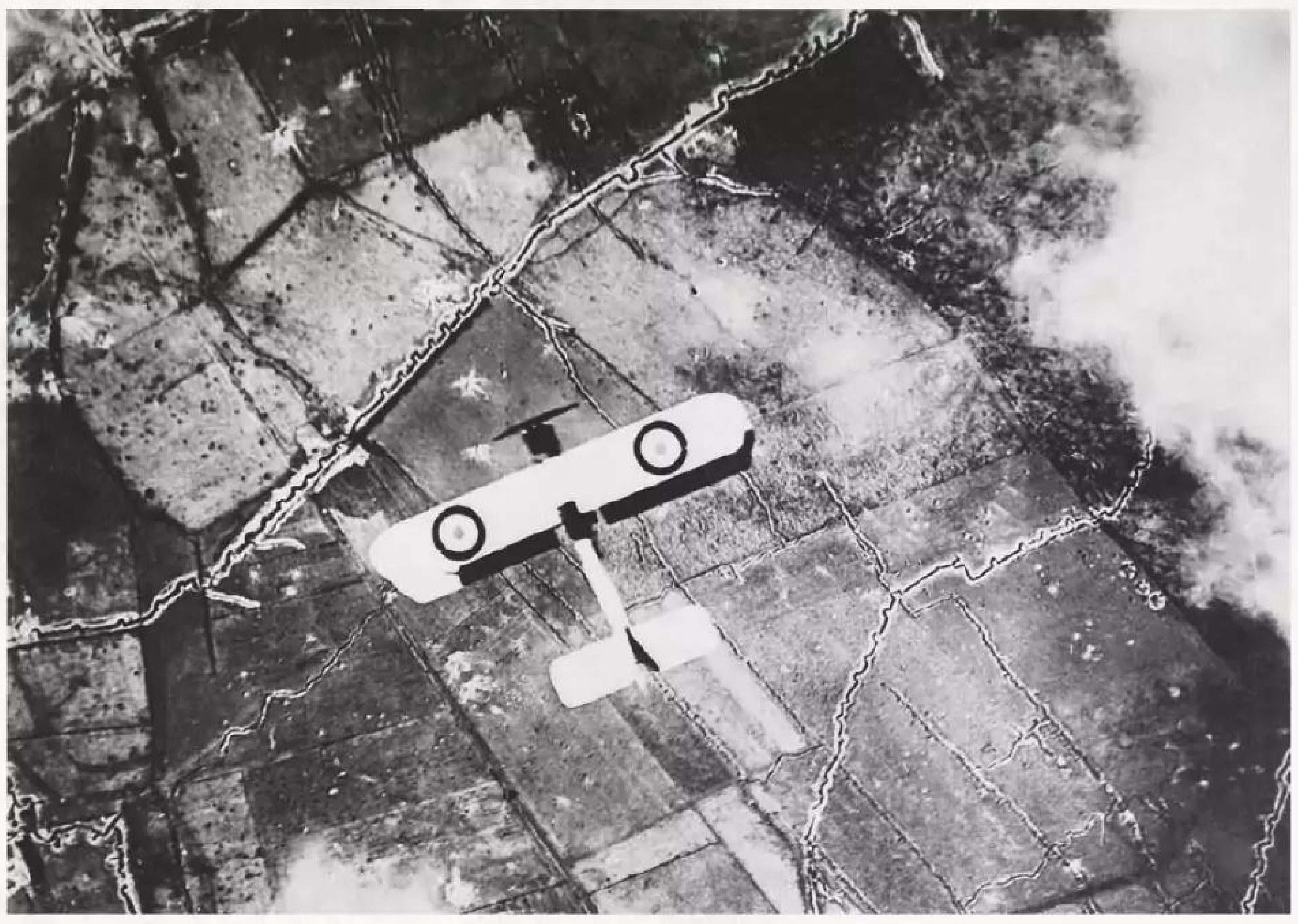
For a long time the French had tried to develop an efficient synchronisation mechanism, which would ensure that machine gun bullets did not hit the propeller blades but only shot between them. Garros' aircraft worked, but not so well that he didn't have to protect the inside of his machine's propeller blades with metal to deflect stray bullets.

The German military was also working to construct a mechanism to synchronise the machine gun and propeller, and following Garros' crash they sent the French pilot's machine to one of their aircraft manufacturers, Dutchman Anthony Fokker.

Inspired by the French device, Fokker's team of engineers succeeded in inventing a fully functioning synchronisation mechanism within a few weeks. Fokker equipped his Eindecker with the new invention, creating a plane that would quickly become a fearsome weapon.

Between August 1915 and for about a year after, German Fokker engineers developed a far superior aircraft, and the Germans made a serious dent in the Allied air forces. Britons and French spoke with horror of the new “Fokker scourge”.

One of the German pilots, whose solo impact was almost identical to the “scourge”, was Oswald Bölcke. He excelled not only as an Eindecker pilot, but also as a knowledgeable air combat theorist who developed tactics that were important to the course of the rest of the air war during World War I.



One of the pilots' main tasks was to photograph enemy positions in the planning of artillery attacks.

Air pioneer hunted like a hawk

Bölcke had first learned to fly around the outbreak of World War I, so the art of flight was quite new to him when in the middle of 1915 he flew in an Eindecker for the first time. But from that point on he enjoyed a meteoric career. Only a year into the war Bölcke's fame was so great that a young flight officer recognised him in the dining car on a train in the autumn of 1915. The young man's name was Manfred Freiherr von Richthofen, who would later become known as “The Red Baron”.

Four hours was the time the first British fighter, Vickers FB5, stayed the air.

Richthofen, who was still unknown in the public, showed great interest in Bölcke and his skills in the air.

“Tell me honestly: how do you do it?” asked Richthofen, and Bölcke willingly sharing his air combat techniques. Richthofen's questions made such an impression on his idol that barely a year later Bölcke recruited the future Red Baron to his squadron.

Before this, Bölcke worked at developing air combat tactics. In the period after the first flight in a Fokker Eindecker, Bölcke hovered almost constantly like a bird of prey over the battlefields. He patrolled German territory at an altitude far above most Allied aircraft so he could attack in a dive. When Bölcke discovered an opponent, he always tried to conceal himself by having the sun at his back, so that the opponent was dazzled and could not see him.

Bölcke's attack consisted of long, sweeping dives where the German ace then shot at close range with small, short volleys. When Bölcke had defeated the enemy, he climbed back up to his original height and resumed his patrol.

During the Battle of Verdun in March 1916 Bölcke was commanding two Fokkers at an air base near the front. Here he introduced a ground-breaking system: an

A German balloon observer fires his signal pistol. The boldest pilots went after observer balloons that hung high up deep behind enemy lines, where they were protected by flak and fighters.

advanced observation post was connected to the air base by phone and could thus warn of French aircraft, allowing German pilots could take to the air in good time and stop the invaders.

Bölcke also used the same kind of aggressive one-man attack at Verdun that he'd developed earlier in the war. The German ace did not yet work with his colleagues on these attacks, but that would soon change.

Germans hunted in packs

Bölcke's 18 air victories by the end of May 1916 saw the German champion pilot's prestige grow to enormous heights, both in the German military and the wider population. The management of the air arm of the German Army was therefore responsive when Bölcke proposed a reorganisation of German air forces.

The Germans urgently need better attack techniques. The Fokker Eindecker's domination in the skies over Western Europe's battlefields was threatened by a new Allied aircraft, the French Nieuport 11, which was superior in manoeuvrability, speed and climbing ability to the German plane. The Allies had now also invented efficient synchronisation mechanisms, allowing French and British pilots to fire their machine-gun straight ahead just like the Germans. "Fokker scourge" was on its last legs.

To combat Allied pilots, Bölcke suggested better cooperation between the pilots on attacks against enemy aircraft. So far German pilots mainly been assembled in "Feldfliegerabteilungen", that is, reconnaissance units, where the task of fighter aircraft like the Fokker Eindecker was to protect the reconnaissance aircraft. Now Bölcke suggested that fighters concentrated in larger groups independent of reconnaissance units and detached from their former escort tasks.

The purpose of the new units of fighter aircraft would be to defeat Allied aircraft that either attacked German territory or German aircraft. The first German "Jagdstaffel" (fighter squadron) was established on Bölcke's instructions in the summer of 1916.

At the same time Bölcke presented his principles of air combat to the commander of the German Army, Air Service Major Herman von der Lieth-Thomsen, and his staff. The principles were collectively named "Dicta Bölcke" and became a manual for dogfights during the war.

Among the advice to German pilots was that they always had to attack the opponent from behind and with the sun at their back to mask their approach. Moreover, they should only shoot at a close range, and when the opponent was in their sights.

Cooperation secured victory

In late August 1916, Bölcke took command of Jagdstaffel number 2, abbreviated "Jasta 2", and he chose an area near Bertincourt approximately 20 kilometres east of the northern French city of Cambrai as its airbase. From here he would take on Allied aircraft, and it was not long before the Germans' new fighter units demonstrated their effectiveness.

The noise of rumbling Mercedes engines filled the air at the airfield east of Cambrai, when five of the Jasta 2 squadron fighters

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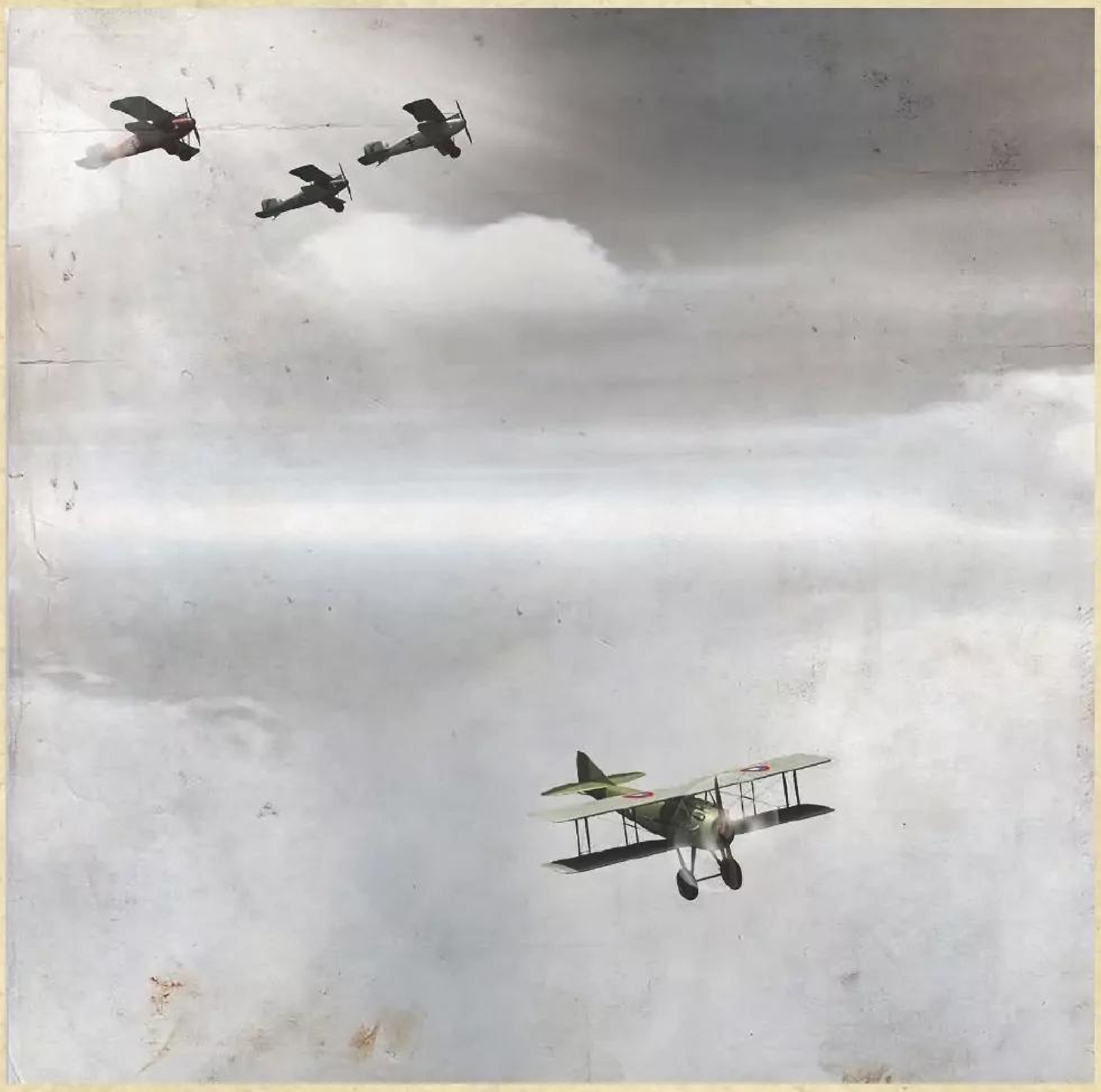
THE PERFECT ATTACK

SURPRISE WAS THE KEY TO SUCCESS

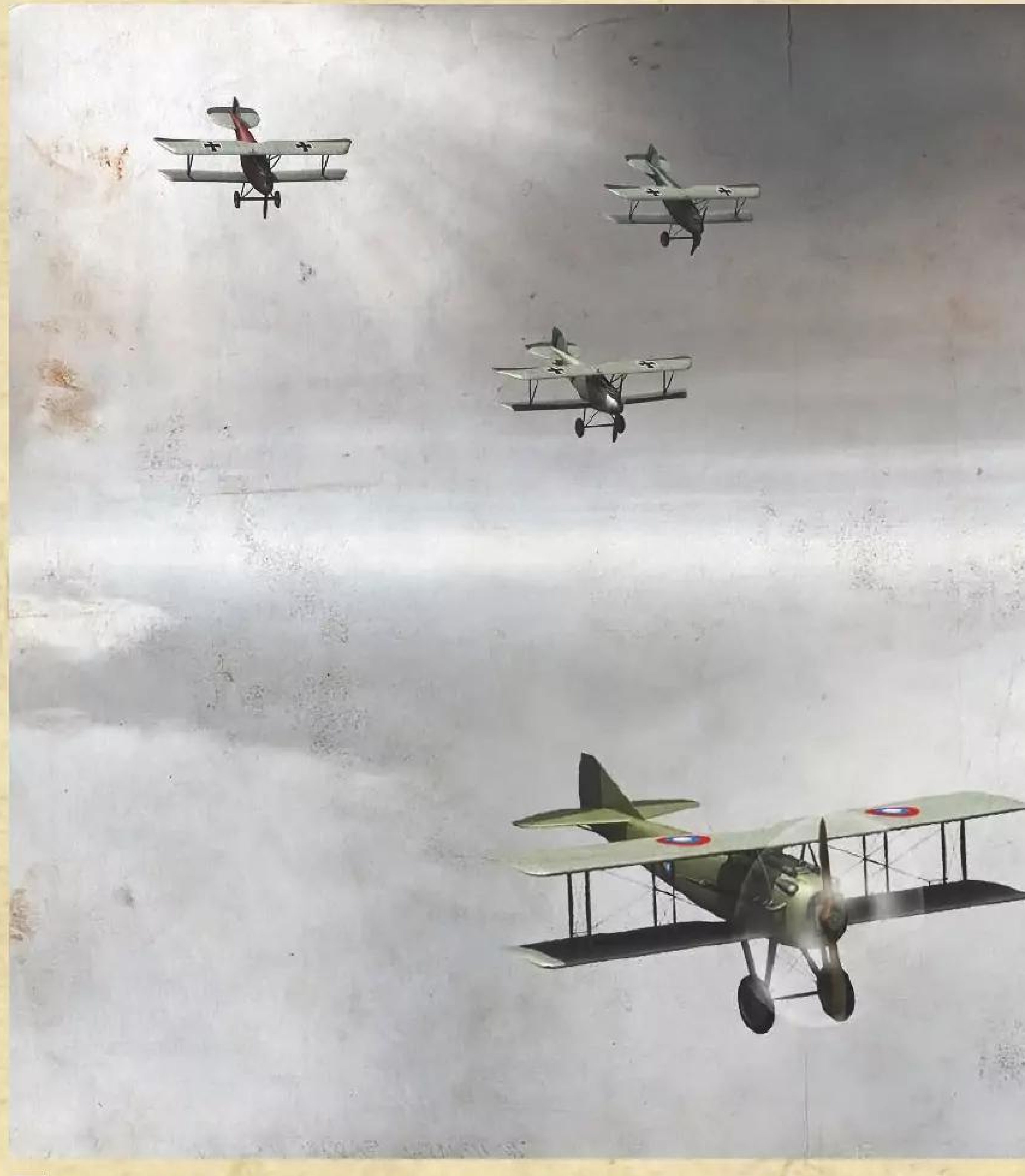
During the war German flying ace Oswald Bölcke developed a number of simple guidelines on how an attack on a hostile plane effectively. Known as Dicta Bölcke, the guidelines became the manual for German air strikes.

1: ATTACK WITH THE SUN AT THE BACK



First, the attacking aircraft rises high so they can surprise their target with a quick attack from behind – preferably with the sun behind them, making them harder to spot.

2: DIVE DOWN QUICKLY ON THE ENEMY



With a fast dive, the attacking aircraft approaches the enemy, preferably while he is absorbed with something else, such as observation or bombing.

started up on 17th September, 1916. With squadron leader Oswald Bölcke leading the Germans' machines they headed for a larger group of British aircraft that was on its way into German-controlled territory to bomb a nearby train station. For the first time a large group of Jasta 2 aircraft had to work together on a mission. By mid-September the squadron had so many aircraft that Bölcke decided that they should all work together. The Germans flew as many planes as possible in close formation with Bölcke at the lead. The first action by the new concept was highly successful, as the German pilots forced down more of the invading British aircraft.

The attack tactics were so successful that for the rest of the year Jasta 2 completely dominated its operation area.

British pilots were being "shot for breakfast"

As a squadron leader Bölcke was a very active pilot, and in September and October he more than doubled his number of victories from 19 to 40. Almost every day he was on the wing, and according to Manfred Freiherr von Richthofen, who had now joined the squadron, Bölcke "every day... shot one or two Englishmen for breakfast". When Bölcke returning from an air mission, his apprentices flocked about him and asked if he had hit another Brit.

"Have I got a black chin?" replied the squadron leader. In other words, if he had gunpowder on his face, he had fired his machine gun and thus – obviously – won another victory.

When Bölcke was not in the air, he put in the time to pass his tactical principles and experience on to his pilots. The teachings from his Dicta Bölcke would become the squadron's backbone. Bölcke continued his vigorous efforts to develop air tactics that he imparted to the German General Staff, and his Jasta 2 became a precedent for other German squadrons.

> "The wing broke, and 150 metres above the ground the squadron leader lost control of his plane".

On 28th October, 1916 the master pilot's luck ran out. During a mission one of the other German machines in Bölcke's formation touched the upper left wing of the biplane. The wing broke, and 150 metres above the ground the squadron leader lost control of his plane and crashed to his death.

Legacy lived on

Bölcke's theories and principles did not disappear – on the contrary. His Dicta Bölcke became the basic guidelines for German pilots throughout the war. Oswald Bölcke's theories and ability to manage his aircraft in combat remained instrumental in the air war and its tactics from about 1916 changed significantly.

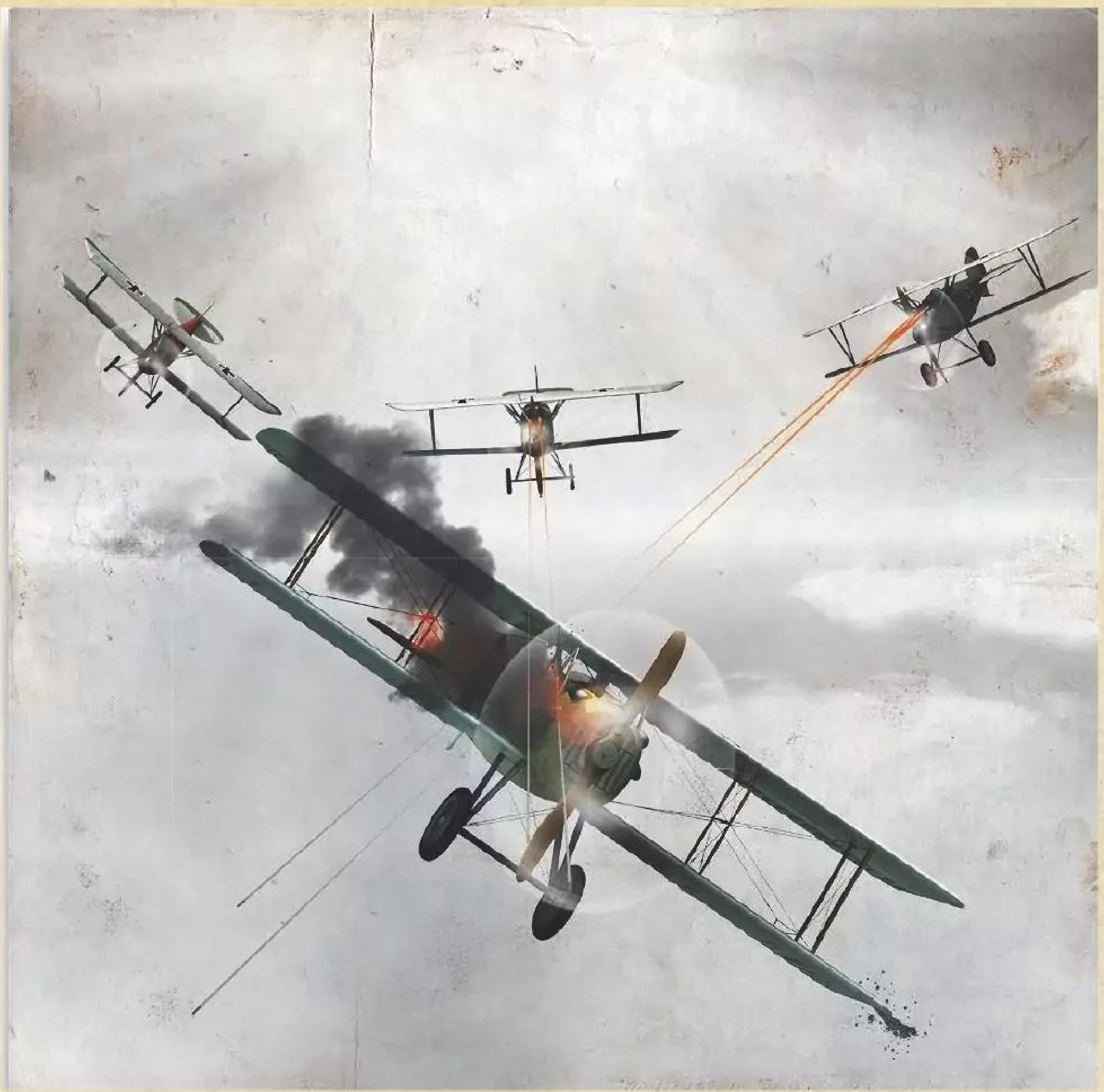
Instead of working randomly and individually pilots began to better work together with more coordinated and organised attacks. Even though fighter pilots continued to hunt individually, offensive squads worked in formations with maybe six aircraft becoming more and more normal. Five planes were often regarded as ideal – two on each side of the lead plane in a V-shape, or four in a diamond shape with a machine at the front, two on each side of the front and rear, with the fifth plane hanging at the back to keep looking behind.

Six victories in a day

How much air war evolved tactically and technologically from the first man-to-man duel in 1914 to the extensive aerial battles known as "dogfights" in 1918, is demonstrated by a skirmish in the spring 1918, which involved French captain Rene Fonck. He became the

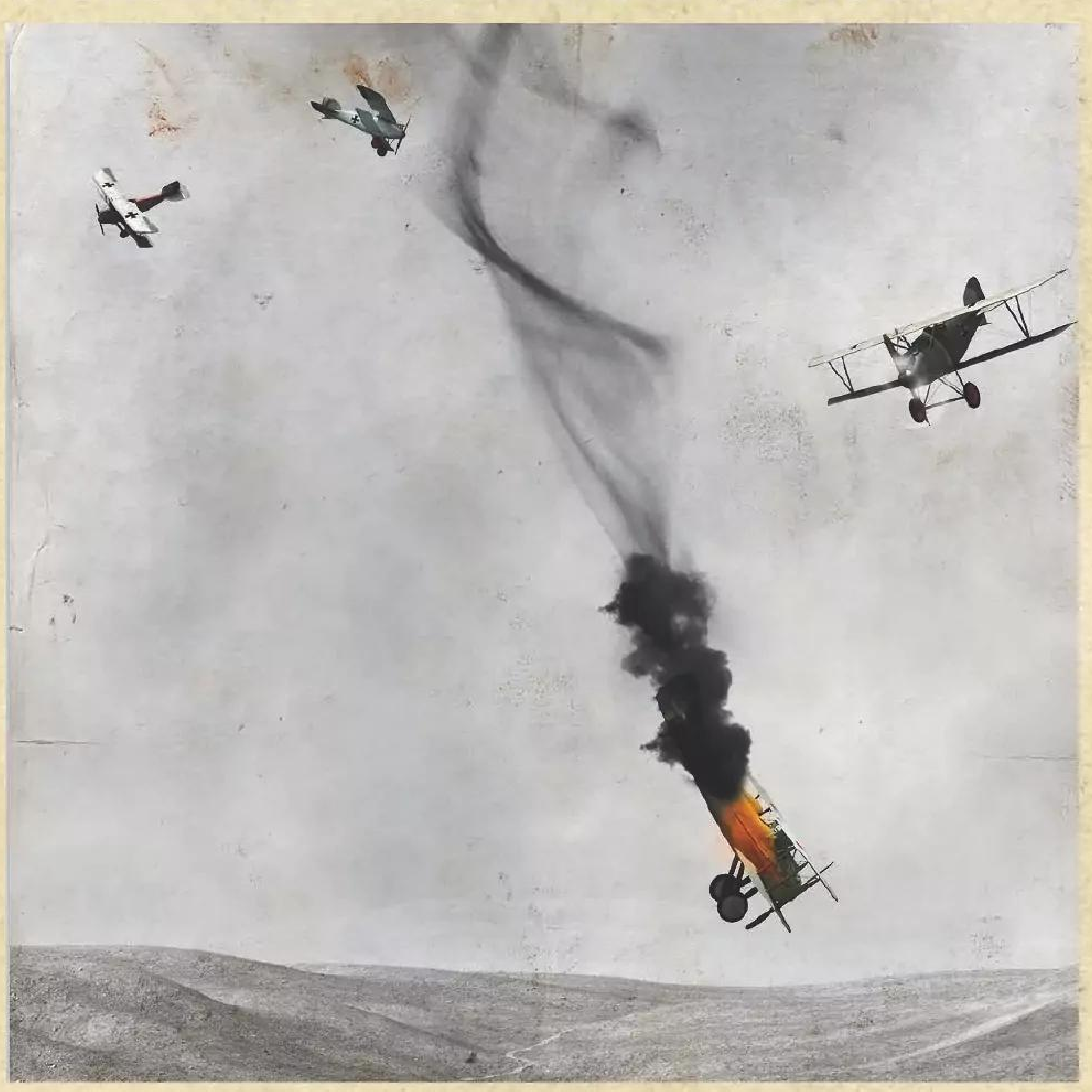
Oswald Bölcke was perhaps the first flying ace of World War I.

3: SHOOT FIRST AT THE LAST MINUTE



■ *The attacking aircraft wait to shoot until they are quite close, and the enemy planes are in sight. Because the sun blinds the enemy, he struggles to defend against it.*

4: FOLLOW THE ATTACK ALL THE WAY TO ITS END

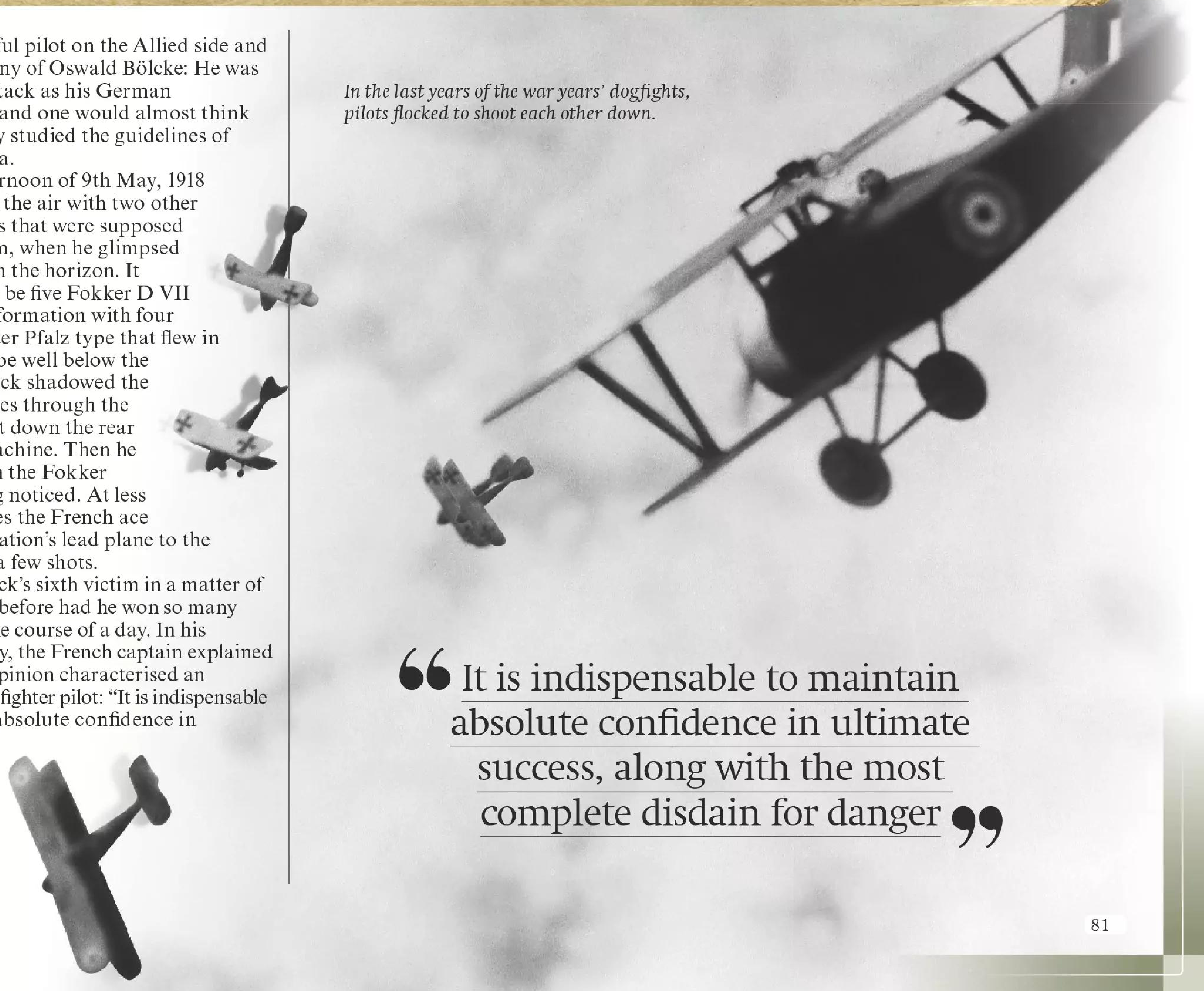


■ *Even though a hostile plane seems damaged, the attacking aircraft follow all the way down. In this way, the attackers assure themselves that the enemy is not trying to escape by simulating the impact of a full hit.*

most successful pilot on the Allied side and reminded many of Oswald Bölcke: He was as keen on attack as his German counterpart, and one would almost think he had closely studied the guidelines of Bölcke's Dicta.

In the afternoon of 9th May, 1918 Fonck was in the air with two other French planes that were supposed to protect him, when he glimpsed some spots on the horizon. It turned out to be five Fokker D VII aircraft in V formation with four German fighter Pfalz type that flew in diamond shape well below the Fokkers. Fonck shadowed the German planes through the skies and shot down the rear Palatinate machine. Then he sneaked in on the Fokker without being noticed. At less than 40 metres the French ace sent the formation's lead plane to the ground with a few shots.

It was Fonck's sixth victim in a matter of hours. Never before had he won so many victories in the course of a day. In his autobiography, the French captain explained what, in his opinion characterised an accomplished fighter pilot: "It is indispensable to maintain absolute confidence in ultimate success, along with the most complete disdain for danger". ■



In the last years of the war years' dogfights, pilots flocked to shoot each other down.

> "It is indispensable to maintain absolute confidence in ultimate success, along with the most complete disdain for danger"

THE GERMAN HUNGER

1914-1919

An effective blockade of merchant ships to the German Empire saw hunger spread rapidly through the civilian population. Soon a fight began over the few available rations before things went completely awry after the potato crop failed in 1916. The women now worried more about feeding their emaciated children than their menfolk at the front. This merciless starvation continued long after German soldiers had laid down their weapons.

1914-19

1914: Winston Churchill launches the Blockade of Germany.

1915: rationing is brought in for basic foodstuffs.

1916: failure of the potato harvest makes famine a reality.

1918: Konrad Adenauer takes out a patent on a soy sausage: “Friedenswurst”.

1918: the Spanish flu hits. 150,000 German civilians die.

1919: peace agreement is signed, and the blockade finally lifts.

1914 1915 1916 1918 1919

Children at a tiny school in eastern Germany had small faces with large, dull eyes, overshadowed by puffed, rickety foreheads. Their thin arms were little more than skin and bones, and their crooked legs and bloated bellies made their ages uncertain. They looked three or four years old, but everyone was in fact around seven or eight when director of the American Relief Administration, future president Herbert Hoover, came to visit.

“You see this child here”, said the physician. “It consumed an incredible amount of bread, and yet did not get any stronger. I found out that it hid all the bread it received underneath its straw mattress. The fear of hunger was so deeply rooted in the child that it collected stores instead of eating the food”.

Mit Gott
W
1914
Für König und Vaterland.

This German cup carried the slogan "For King and Country".

The year was 1919 – after the ceasefire in Europe. For five years, the German Empire had been prevented from trading with the world, and the Allies refused to lift their blockade until the peace agreement had been signed.

The plan to starve the Germans to defeat had been launched in August 1914, when Winston Churchill mobilised the world’s biggest war fleet, the Grand Fleet.

Supplies were quickly exhausted

Both the British and the Germans had signed the Hague Convention in 1907, which ensured the free passage of merchant ships during the war. But the British ignored the agreement and soon intercepted all goods making their way to the German Empire. The enemy would be starved into submission, and the Germans were particularly vulnerable because they imported between one quarter and a third of their food.

Still, the authorities tried to make light of the threat, and a poster from 1914 depicted two overweight police men laughing with the caption: “What? And will England starve us? Oh no!” The over-confident attitude was not sheer propaganda, for like all the other warring nations, the Germans believed the war would be a short one.

The gravity of the situation soon hit home, however – especially among the urban working class. The first casualty was bread, because Germans imported most of their wheat and when farmers could no longer buy cheap feed from Russia or the UK they began reserving cereals and potatoes for animal feed.

In December 1914, the entire grain stock for the following year had been exhausted and potato prices rose sharply. While both Britain and France were conscious of the link between success in the war on the one hand, and the importance of food and morale on the home front on the other, the German Empire’s primary focus was its military. The tactic played at home was to simply deny there was a lack of food or play on people’s fading morale.

In a speech published in *Vossische Zeitung* on 2nd February, 1915, the National News Service insisted that any food shortages could be traced to people’s lack of reason and restraint: “Those who stuff themselves full, those who push out their paunches in all directions, are traitors to the fatherland”, it said.

1 Einheit
Pferdefleischkarte
für
Gültig ab
Stadt Elberfeld

Everything was rationed, even horse meat, and increasing numbers of women in the endless food queues were so weak that they collapsed from hunger.

Other official propaganda went even further by claiming that the war was good because it rid Germans of their nasty habit of eating too much. Townsfolk were told they “had grown used to the luxury of overeating” and had consequently lost the hardiness and frugality that was a key part of the German national character.

Milk became scarce

The war was quickly harsh on the Germans. 750,000 fell on all fronts during the first year, and at home women increasingly struggled to provide food for their children.

In the cities, working-class women slept on the street to avoid being late for the next day’s market, and yet

HERBERT HOOVER, *1874-1964*

EMERGENCY RELIEF INNOVATOR

■ American mining engineer Herbert Hoover was living and working in Britain when war broke out. Here he quickly became involved helping fellow Americans flee the war zones in Europe. When the Germans invaded neutral Belgium, Hoover started organising humanitarian aid for Belgian civilians, now cut off from outside supplies. When the US entered the war, Hoover returned home to become head of the US Food Administration from 1917-18. In 1918 after the war ended, Hoover returned to Europe as head of the American Relief Administration, which distributed food and other essential supplies to a ravaged and broken Europe. After two years he returned again to the US to begin a political career, which culminated in his election as US President in 1928.

Mining engineer – Quaker – Graduated from Stanford University – Founded international relief organisations – 31st US President

they often went home empty handed, as reported by *Vossische Zeitung* in 1915.

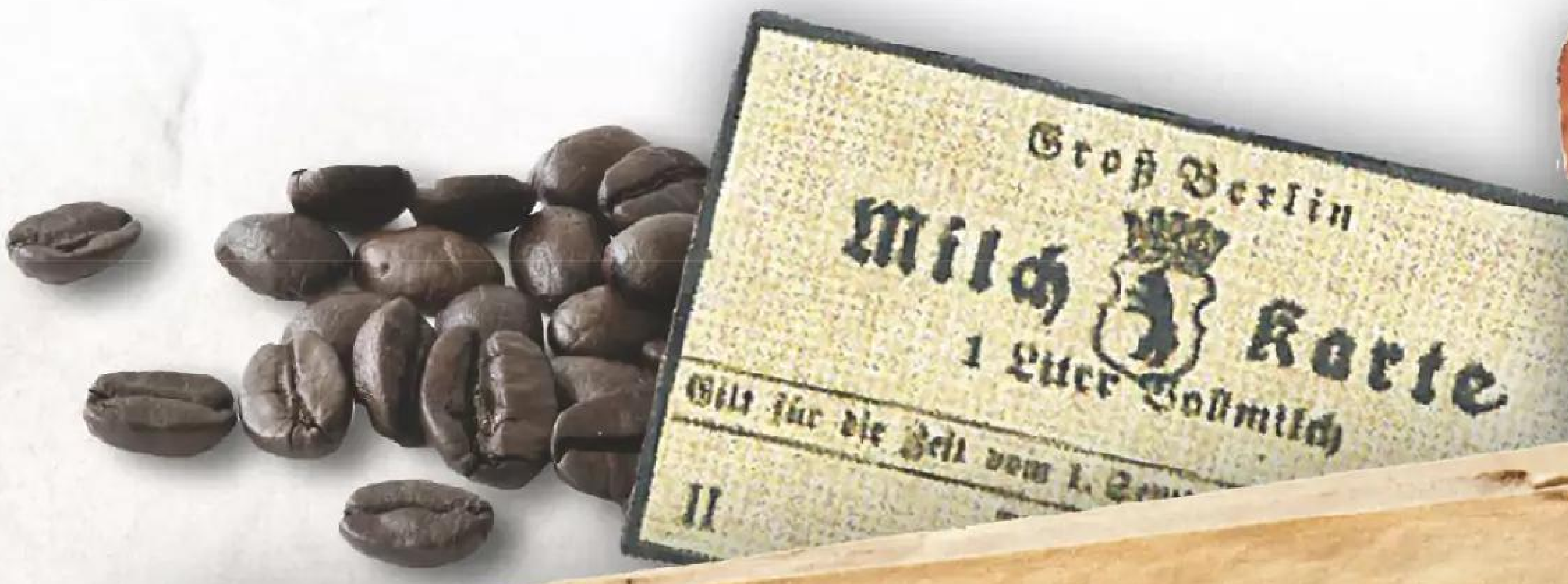
"We could have wished that Lord Mayor Wermuth had been there another half hour. Then he could have heard the complaints and desires of the disappointed women, who left empty-handed after another sleepless night full of hope and patient perseverance".

In 1915, the most basic foodstuffs were rationed, and over four million women and families with men at war began to receive support from the authorities. But the subsidies did not go far.

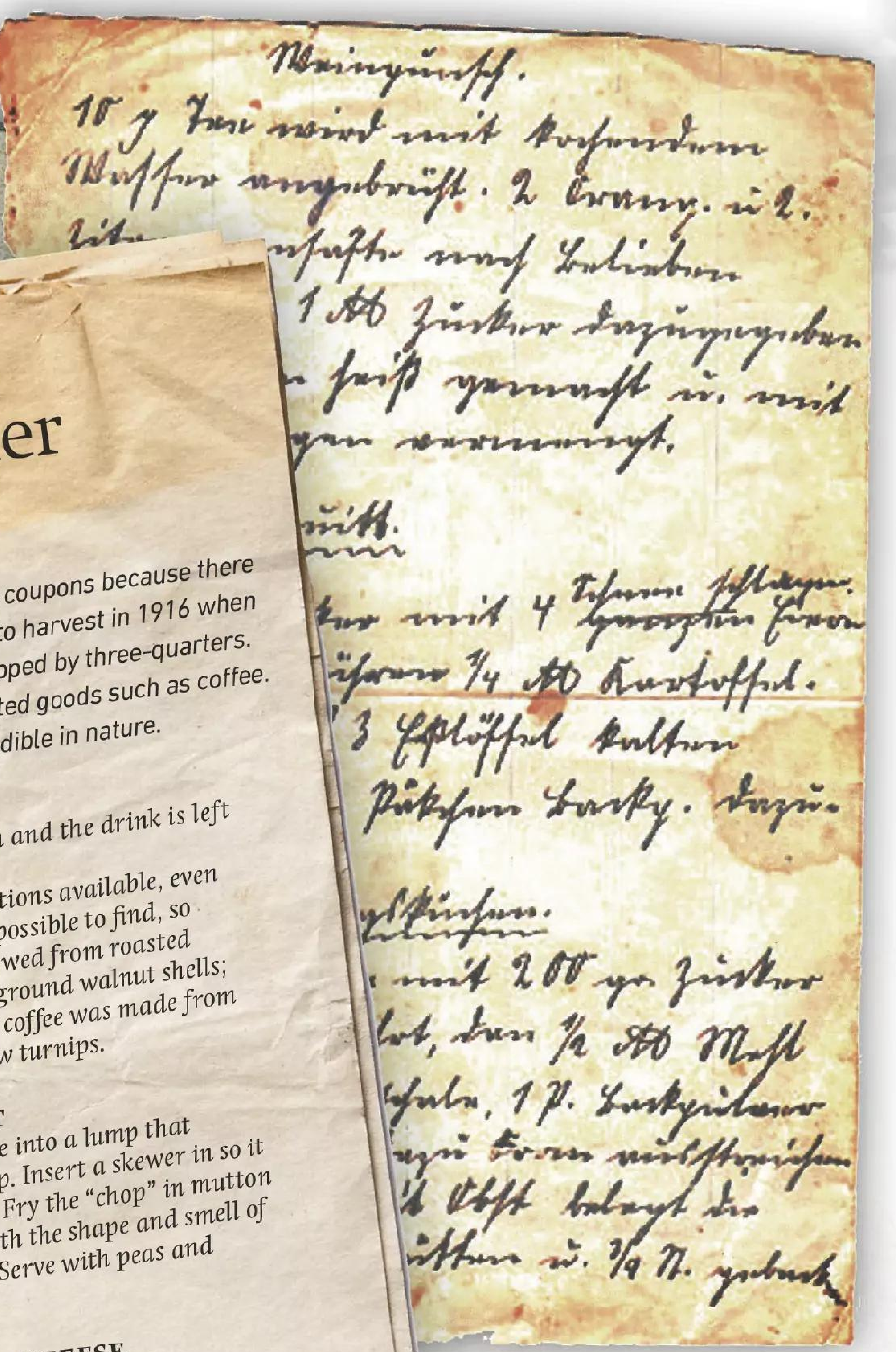
Deliveries of milk to the cities was halved in the first years of the war, and in the summer of 1916 the newly established War Food Office rationed milk, so infants were limited to a litre of milk each week, while children aged 3-4 had to make do with 750 ml. Women with two months left of their pregnancy also received 750 ml. Malnutrition hit the weakest and infants died in the arms of their mothers.

DISTRUST BETWEEN RURAL AND URBAN

Some mothers tried to send older children to the countryside, where they could help in the fields. But when the harvest failed, the last thing farms needed was more mouths to feed. Hunger had created a certain understanding



Groß Berlin
Milch Karte
1 Liter Vollmilch
Gilt für die Zeit vom 1.
II



Food became thinner and colourless

Virtually all items were rationed, but it was difficult to spend all the coupons because there simply wasn't enough food. Things went wrong after the poor potato harvest in 1916 when Germans calorie intake fell to 1,000 per day as their fat intake dropped by three-quarters. All were encouraged to find substitutes for meat as well as imported goods such as coffee. Food was diluted or mixed with leftovers and anything remotely edible in nature.

OATMEAL GRATIN

250 ml of milk (or equivalent diluted milk) is boiled with 150 grams of oatmeal and some salt and sugar. Lemon zest and vanilla can be used as a spice if available. An egg-white whipped white as snow is then mixed into the cooled mixture and then baked for 45 minutes. Eat with fruit compote or juice.

BAKED OATMEAL

Boil oatmeal, water, salt and tomato puree and then mix in chopped pieces of meat. The dish is then baked in its original form to provide a simple, but hearty dish.

COFFEE FROM TOASTED BREAD

Collect the crusts from white and brown bread, then break into small pieces before drying and storing until there is a large amount. Toast the crusts in a pan with a small amount of butter. Ground the largest pieces in a coffee grinder and mix with a little bit of chicory root if available. Add boiling water and bring back to the boil. When the mixture has boiled, the mixture drops to the bottom and the drink is left on top.

With the few rations available, even crusts could be impossible to find, so coffee was also brewed from roasted acorns, peas and ground walnut shells; eventually a poor coffee was made from carrots and yellow turnips.

RICE CUTLET

Form cooked rice into a lump that resembles a chop. Insert a skewer in so it looks like a leg. Fry the "chop" in mutton fat, so it has both the shape and smell of the real thing. Serve with peas and watercress.

SOUR MILK CHEESE

Leave well-drained and unsalted sour milk in a covered bowl in the kitchen for 3-4 days. As it goes mouldy, stir frequently.

Add a pinch of butter, caraway and salt to taste. Mix in 2-3 pinches of baking soda, stirring constantly, until the mass is soft and almost liquid. Finally, pour the mix into a bowl rinsed with water and allow to cool.

Dry bread crumbs and crusts were collected. They could be roasted and used as a substitute for coffee.

Warmes Mittagessen
Portion 35

In towns and cities hot soup made from beets was distributed to the poor. If they were lucky, it might even contain some rat meat.

between rich and poor in the towns, but many urban dwellers suspected farmers of holding on to their grain, meat and potatoes to sell at inflated prices on the black market.

In the war's early years, agriculture had artificially inflated prices by shifting production to avoid the regulatory price cap, and if wealthier townsfolk had enough money or connections in the country, they could buy on the black market.

But the poor harvest and ongoing blockade eventually affected all Germans. Agricultural production was also hit by a lack of manpower, as the army refused to exempt almost all farmers from service. Women and children were left to cope with the hard work in the field, and when the military regularly seized farm horses, they were even forced in many places to work in front of as well as behind the plough.

The Kaiser was hated

The extremely cold winter of 1916-17 affected the whole of Europe, but while the Allies managed to maintain morale on the home front, it crumbled among Germans. Too many now equated meat with boiled crow or rat but even then, only on good days – most lived on carrots and beets.

In the midst of famine, the German nation suffered along with the rest of the world from a virulent form of flu dubbed "Spanish flu". Princess Evelyn Blücher of Wahlstatt wrote in her diary on October 1918 that the epidemic took what hadn't been destroyed by war.

"There is hardly a family that has been spared. From our housekeeper at Krieblowitz I hear that the whole village is stricken with it, and the wretched people are lying about on the floors of their cottages in woeful heaps, shivering with fever and with no medicaments or anyone to attend them".

In October 1918, 2,770 Berliners died from the flu alone – half of all the city's deaths that month. In total, 150,000 German civilians died from Spanish flu during the war. The disease coupled with a lack of food and growing distrust in German society ate away at the Germans, and unrest spread in 1918.

This led to a growing indifference towards the war. Kaiser Wilhelm II and his family became very unpopular, and a saying was that "When old Bill's [the Kaiser's] lady wife queues for spuds, then the war'll be over".

1,000 calories are what Germans received daily; Britons got 3,400 calories.

Discontent spread

In early 1918, one million workers demonstrated around the country – half of them in Berlin. Rumours spread that the Bolsheviks had succeeded in toppling the Tsar and pulling Russia out of the war. At the same time, soldiers in the German army deserted in their tens of thousands, and hungry civilians began to hear the brutal truth about the war, namely that defeat was imminent.

Throughout the autumn, the Germany army fell apart, and riots on the home front increased. The Kaiser was forced to abdicate, and the new government agreed a ceasefire with the Allies.

But the horror was not over. The Allies maintained the trade embargo, and the French demanded their war reparations be paid before the Germans could buy food. Princess Blücher of Wahlstatt wrote in her diary on 12th November that she saw only fear and horror. Depressed and terrified women contemplated killing themselves and their children rather than continuing to live on vegetables and dry bread.

British soldiers who'd been deployed to keep an eye on the Germans during the ceasefire begged to be sent home in 1919 because – according to General Herbert Plumer – they couldn't endure the sight of "hordes of skinny and bloated children pawing over the offal" from the British camps.

Plumer along with Hoover and other Allied delegations in Germany tried to convince politicians to halt the blockade.

But the French were bitter, and David Lloyd George had only just won a General Election on the promise of severe punishment for the Germans.

Only when the victors had completed negotiations, and Germany had signed the peace treaty in July 1919, was the Allied blockade lifted. By this time the year's harvest had already failed and the German working classes would remain undernourished well into the 1920s. ■

MEANWHILE, IN RUSSIA

THE SOLDIERS LEFT THE FRONT, AND REVOLUTION ERUPTED

During the war, the situation in Russia became more and more desperate. All food and resources went to the soldiers at the front, while civilians died of starvation. Demonstrations in February 1917 led to the Tsar's abdication and the Duma took charge of the country. In October, revolution broke out again – this time led by Vladimir Lenin – and the Bolsheviks took power. The new government made peace with Germany and withdrew from the war. The result was civil war until 1921. In 1922, the Soviet Union was finally established – with Lenin as its leader.

WAR LOGISTICS

1914-1918

While the soldiers risked their lives in the trenches, a gigantic arsenal of chefs, food couriers, stretcher bearers and railway engineers toiled behind the fronts to keep the engines of war running. New troops were sent to the front by ship and train, while the injured were transported in the opposite direction. In field kitchens catering teams strived to feed thousands of mouths. During the war the Allied supply lines developed into an advanced network of shipping routes, railways and horse caravans. Yet soldiers' field rations shrank year by year.

1914-18

1915: British soldiers eat two million tonnes of meat a month.

1915: 266 die in worst ever British rail accident at Quintinshill.

1916: engineering troops extend railways to the front.

1917: the daily bread rations in the British trenches shrinks.

1918: troops eat 34 million tonnes of meat a month.

1914 1915 1916 1917 1918

Signalman George Meakins was in charge of the signals at the small railway junction at Quintinshill, about 100 kilometres south of Edinburgh. The line that ran past Meakins' signal box was the lifeblood of the British war against the Central Powers. German U-boats were ravaging southern English ports, and so many supplies arriving by cargo ships from across the Atlantic landed in the Scottish ports of Glasgow and Clyde to be transported by train to Birmingham and London. The railway line was also used simultaneously to transport troops and passengers.

Meakins' shift ended early on 22nd May, 1915, but he didn't head for home. Meakins had an unofficial agreement with substitute James Tinsley that meant he worked longer so Tinsley could catch a later train and sleep for an extra 30 minutes each morning.

The railway line was busy on this particular morning, with a train in the northbound siding waiting for permission to continue. As his replacement's local train arrived from the south, Meakins directed it onto the southbound line – where he wasn't expecting any other trains – to keep the main northbound line free. Tinsley arrived and prepared to take over from Meakins, but neither signalman had ensured the signal had been "locked" to indicate the local train was blocking the southbound route.

Soon after being told about an unscheduled troop transport from the north, Tinsley waved through the train without thinking about the local train. The transport with soldiers from The Royal Scots' 7th Battalion came roaring through at full speed and hit the local train just outside the signal station. The train's lanterns were set ablaze, while hundreds of panicked and burned soldiers fought their way out of the wreck. At that moment, an express train rattled through on the opposite track hitting several of the wounded soldiers on the lines.

ARMY DEMANDED 34 MILLION TONNES OF MEAT

The train accident at Quintinshill killed 226 people and was Britain's worst ever. It was tragic proof of how difficult it was to choreograph World War I's extensive transport of equipment, supplies and troops. Thousands upon thousands of soldiers, truckloads of food and boxes of weapons had to be shipped, driven and carried from producers to military camps and trenches to keep the war going. And the logistics became increasingly difficult and dangerous as the front drew nearer.

Rockets were used to communicate between bases and trenches when phone lines were broken.

The amount of manpower and equipment grew as the war progressed. For example, in August 1914 the UK had 120,000 troops in France – by the end of the war in November 1918 that number had increased to three million. The number of British military horses grew in the same period from 53,000 to 500,000.

More soldiers and horses also increased demands for food and water. While at the beginning of the war British soldiers could be satisfied with around two million tonnes of meat a month, the troops' monthly requirements had risen to 34 million tonnes by the end of the war, along with 45 million tonnes of bread. Similarly, military vehicles including tanks consumed 3.2 million litres of petrol a month in 1914 versus 49 million litres by the war's conclusion.

In total, the British sent billions of tonnes of supplies from the UK to its soldiers in France during World War I. Cooks prepared part of the food in large bakeries on British soil, but it could take over a week for the bread to reach the soldiers in the trenches from the ovens. Eventually, the British set up field bakeries in France, where women toiled around the clock to feed hungry soldiers.

TRANSPORTS GOT STUCK IN MUD

The transport of troops or supplies from Britain to the fronts in France took place through a complex supply chain. A cargo typically started in a British port from where ships transported it across the English Channel to a so-called base depot in France. Here both men and goods were loaded into railway wagons and moved to an advanced supply dump, then by lorry or bus to a division replenishment post and finally transported by horse to bases close to the front.

From the bases, the units themselves transported the supplies to the front, either

TECHNOLOGY CULTURE ECONOMY EVERYDAY

Pigeons and dogs brought messages

When the phone lines failed, soldiers sent military pigeons on the wing. The pigeons flew extensively in regular service between military bases and trenches to bring the latest news, coordinate actions and call for help between units. Several pigeons were officially honoured for their efforts. The noise and chaos at the front meant, however, that pigeons could become disoriented, so the military also trained messenger dogs to run with letters.

SUPPLY
C.C.141

The Allies transported supplies with trains, cars and horses and even in military tanks.

> “It could take over a week for bread to reach the soldiers in the trenches from the ovens”

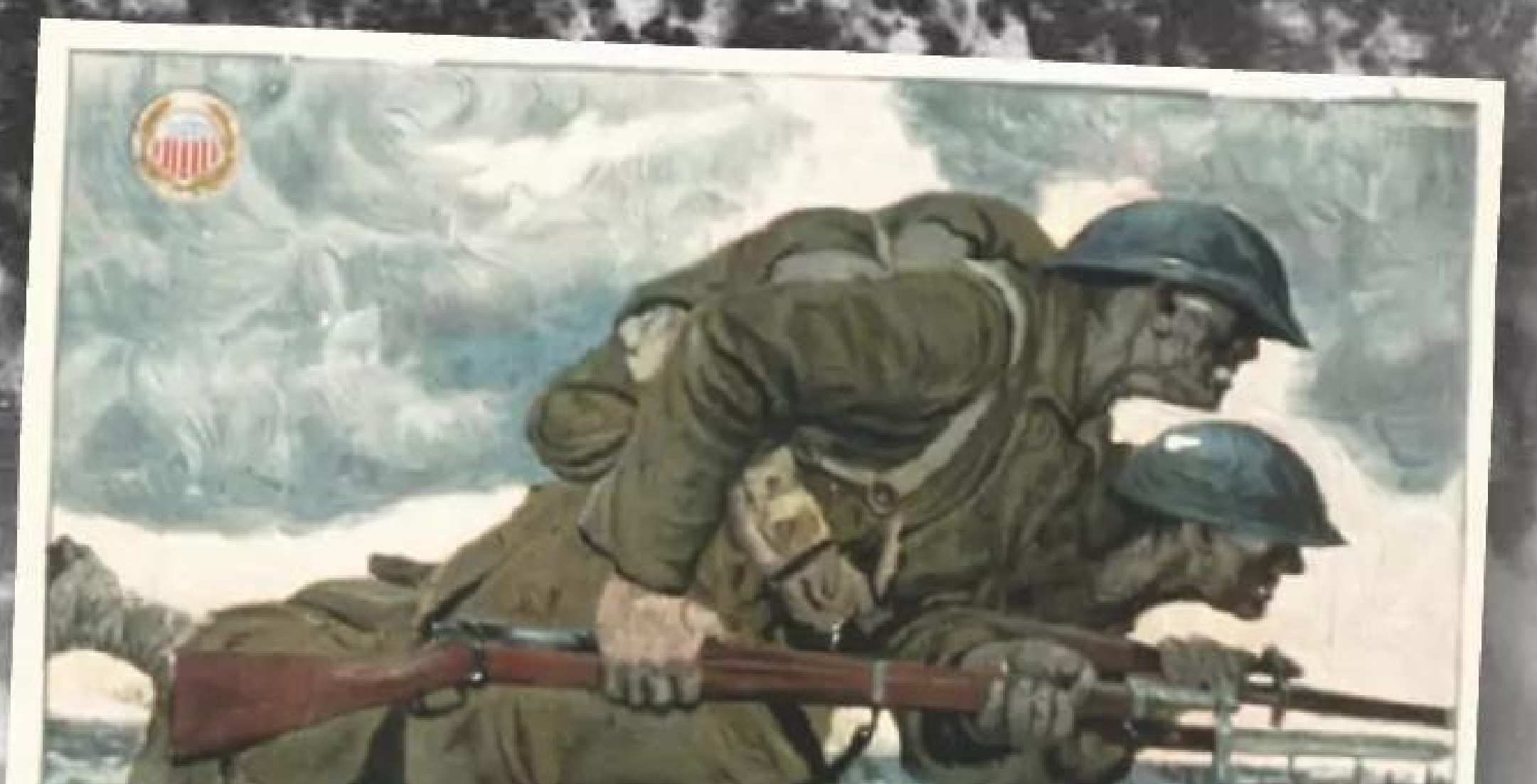
on their own backs or with horses or mules to help. Although the British Army used cars for transport, the soldiers were still heavily dependent on horses. Near the front, where many areas had been transformed into one large impenetrable sea of mud and shell craters, the animals were the only means of getting through, but even the horses had to give up sometimes when their hooves got stuck in the mud after major rainstorms.

When war broke out, the British picked up horses from Spain and Portugal as well as further afield from the likes of India, China and New Zealand. When the animals finally reached the battlefield, they suffered under the deafening explosions and blinding flashes of light from shells. And like the soldiers on the front line, horses were left thirsty and starving when the enemy attacked a supply line. Although the armies on both sides of the front developed gas masks for horses, many animals suffocated during chlorine gas attacks. Others died in the mud with their legs blown off, stomachs open or caught in the barbed wire of no-man’s land. A total of one million military horses were sent to the front during World War I – only 62,000 survived.

Railways facilitated transport

From early 1916, to facilitate the transport of troops and supplies over land in France, the Allies began to build new railways that reached almost to the front, replacing parts of the four-legged transportation network with freight cars.

The Royal Engineers looked to develop a new type of track specifically for the battlefield. The rails were lighter than normal tracks and were produced in fixed lengths, so they could be easily transported to sites where they were usually placed directly on the bare soil. The tracks of these so-called “light railways” were also much easier to repair and replace than stone-paved roads.



Posters in the United States urged Americans to send food to soldiers in Europe

The engineers found themselves augmented by more and more colleagues throughout the war. They worked not only to build light railways, but also to maintain

>>>

PREPARATION: *field rations were prepared as far away as Britain or the US. Here women chop onions for canned meat.*

FIELD KITCHEN: *near the front catering teams baked, fried and cooked soldiers' meals in primitive kitchens.*

DELIVERY: *couriers ran from the kitchens to the trenches with food.*

the sprawling rail networks throughout the British sectors in France, Egypt and Greece. Army technicians also ran telephone cables between military bases and trenches – a network that was essential in coordinating actions between the different units. They built and rebuilt bridges over raging rivers and both maintained and repaired the mechanics in weapons and military vehicles.

The engineering rank and file's roster was dictated by circumstance, which often meant working around the clock, particularly when enemy shells had blown up essential railway or telephone lines. An engineer's tasks were – like the soldiers they supported – dangerous work. While they were laying rails or laying cables, they had to be constantly alert for enemy artillery and the bombs from the Imperial German Air Service.

The enemy bombed blindly

The worst dangers lurked, however, on the final part of the supply line from the light railways out to the trenches. Supplies and troops took their final steps to the front lines under cover of darkness, for if the enemy saw the new troops, they would most likely launch a massive bombardment.

On both sides of the front soldiers had, however, twigged that transports and troop replacements usually took place at night, and therefore they bombed the routes and railways to the front in the hours of darkness – often blindly. At the same time snipers lurked and kept looking for the slightest flash of light they could aim at.

Even an imprecise bombardment could have an effect, for if the transportation was by horse-drawn wagon or cart, the roar from the shells could panic the animals into running madly into one of the countless shell craters. Their heavy loads made it impossible to rescue them.

Tea tasted of vegetables

Field kitchens at the front were set back a little way from the trenches, out of range of enemy artillery. Here 300,000 men worked through the war to cook, roast and bake the British soldiers' meals. The kitchens were primitively furnished, and the chefs prepared all the food for a single battalion in just two pots. The food therefore often had hints of the previous meal, and soldiers complained – for example – that their tea tasted of vegetables.

> "Raisins, chocolate, sweet biscuits, mints and tobacco were luxury items that the soldiers carefully divided between them"

A British soldier's daily diet consisted officially of 4,000 calories that often was served in the form of bully beef – a salted, stringy beef that was canned – along with bread or biscuits. The can opener was therefore a real and vital part of the soldiers' equipment.

When supplies were short, soldiers had to settle for the likes of pea soup with a few chunks of horsemeat and weeds or nettles thrown in. Raisins, chocolate, sweet biscuits, mints and tobacco were luxury items that the soldiers carefully divided between them.

Kitchen crews also packed food and brought it up to the soldiers in the trenches. For this they used the so-called Dixies – British Army camp kettles that were basically large metal pots, often second-hand kerosene cans worn on their backs with straps. The crews delivered the food on foot through highly dangerous terrain, and many lost their lives.

The twin threats of enemy bombardment and snipers meant transport was often delayed and the food was rarely hot by the time it reached the trenches. Some soldiers were able to scrimp together enough money to buy a small primus stove so they could reheat the food and brew tea in the trenches.

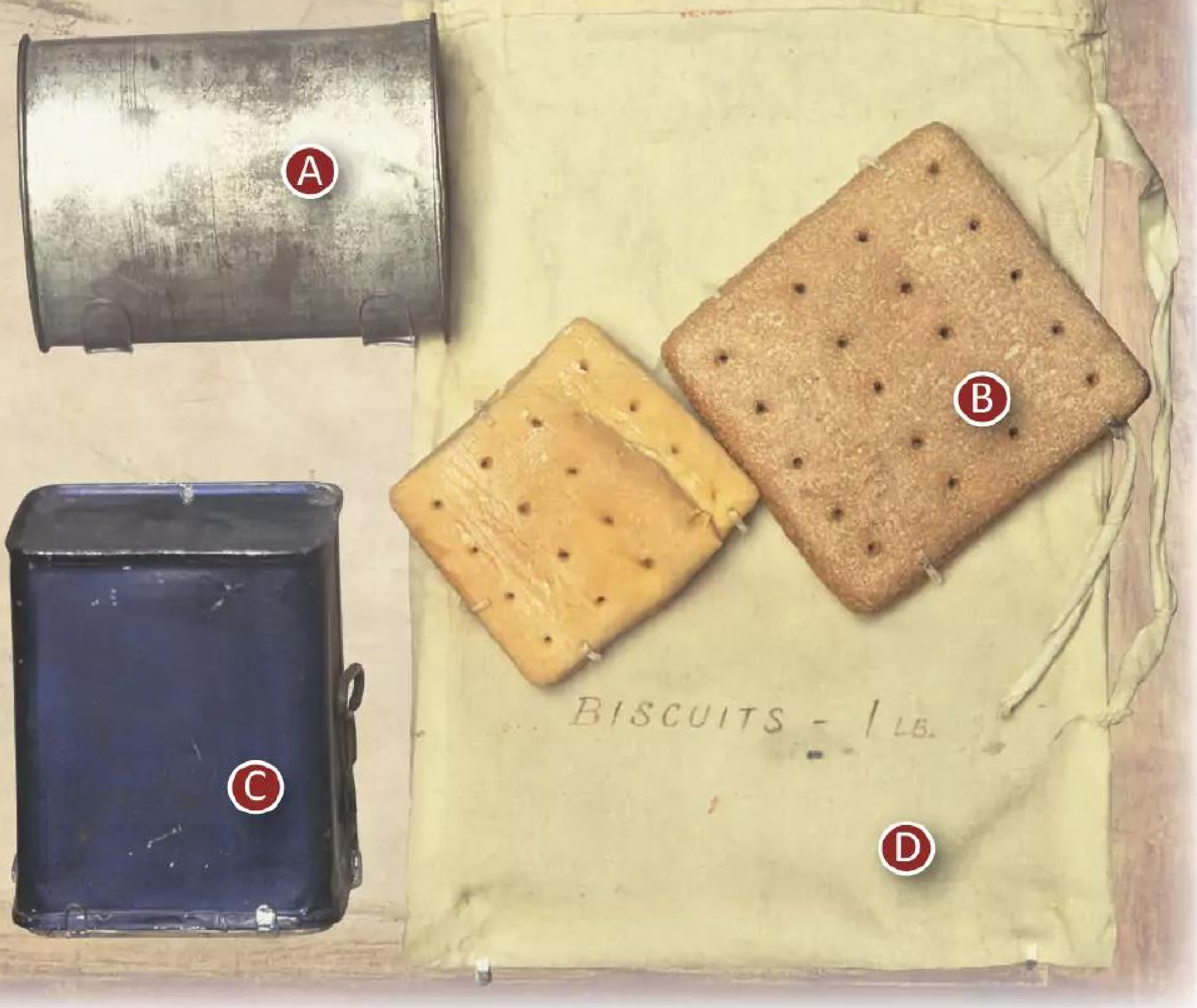
Rations shrank over time

At the beginning of the war, frontline soldiers received 285 grams (10 ounces) of meat every day; by 1916 they had to settle for 170 grams (six ounces). Later, meat rations were restricted further, so soldiers only ate meat nine days a month. In his memoirs, machine-gunner Harry Patch recalled:

"You were lucky if you got some bully beef and a biscuit. You couldn't get your

EMERGENCY RATIONS KEPT THE SOLDIERS ALIVE

When soldiers occupied enemy territory, they had to survive on rations until there were organised food deliveries into the area.



Ⓐ Tin with tea, sugar and stock cubes.

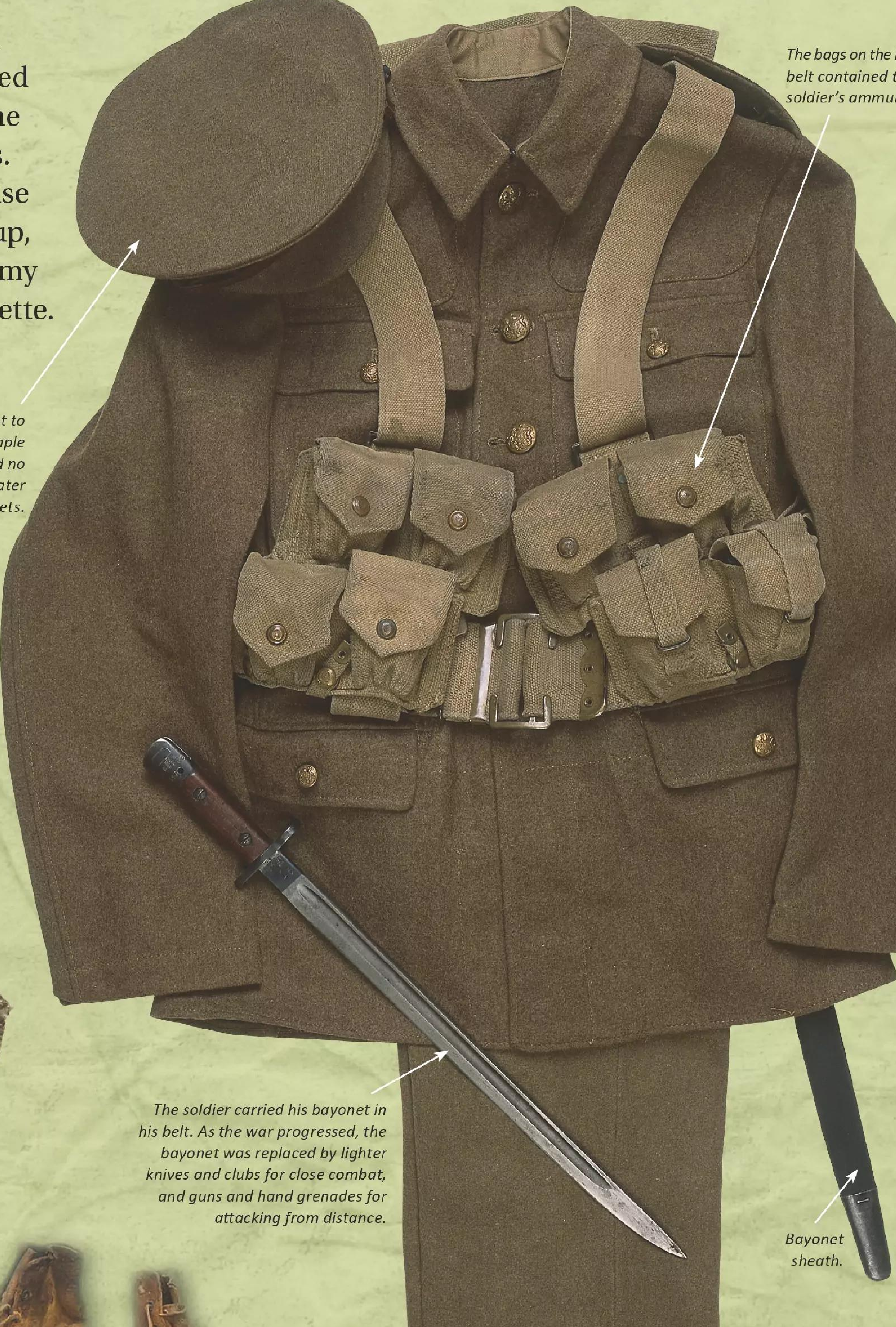
Ⓑ 350 g of biscuits would last for several days.

Ⓒ Bully beef: the salted, chopped canned beef lay heavily on hungry soldiers' stomachs.

Ⓓ Emergency rations were packed in a canvas bag.

UNIFORM LOOKED LIKE MUD

The khaki-coloured uniform camouflaged British soldiers in the mud of the trenches. The colour was no use if the soldier stood up, however, as the enemy could see his silhouette.



The bags on the leather belt contained the soldier's ammunition.

When British troops went to war in 1914, they wore simple military caps, which offered no protection. These were later replaced with helmets.

The soldier carried his bayonet in his belt. As the war progressed, the bayonet was replaced by lighter knives and clubs for close combat, and guns and hand grenades for attacking from distance.

Bayonet sheath.

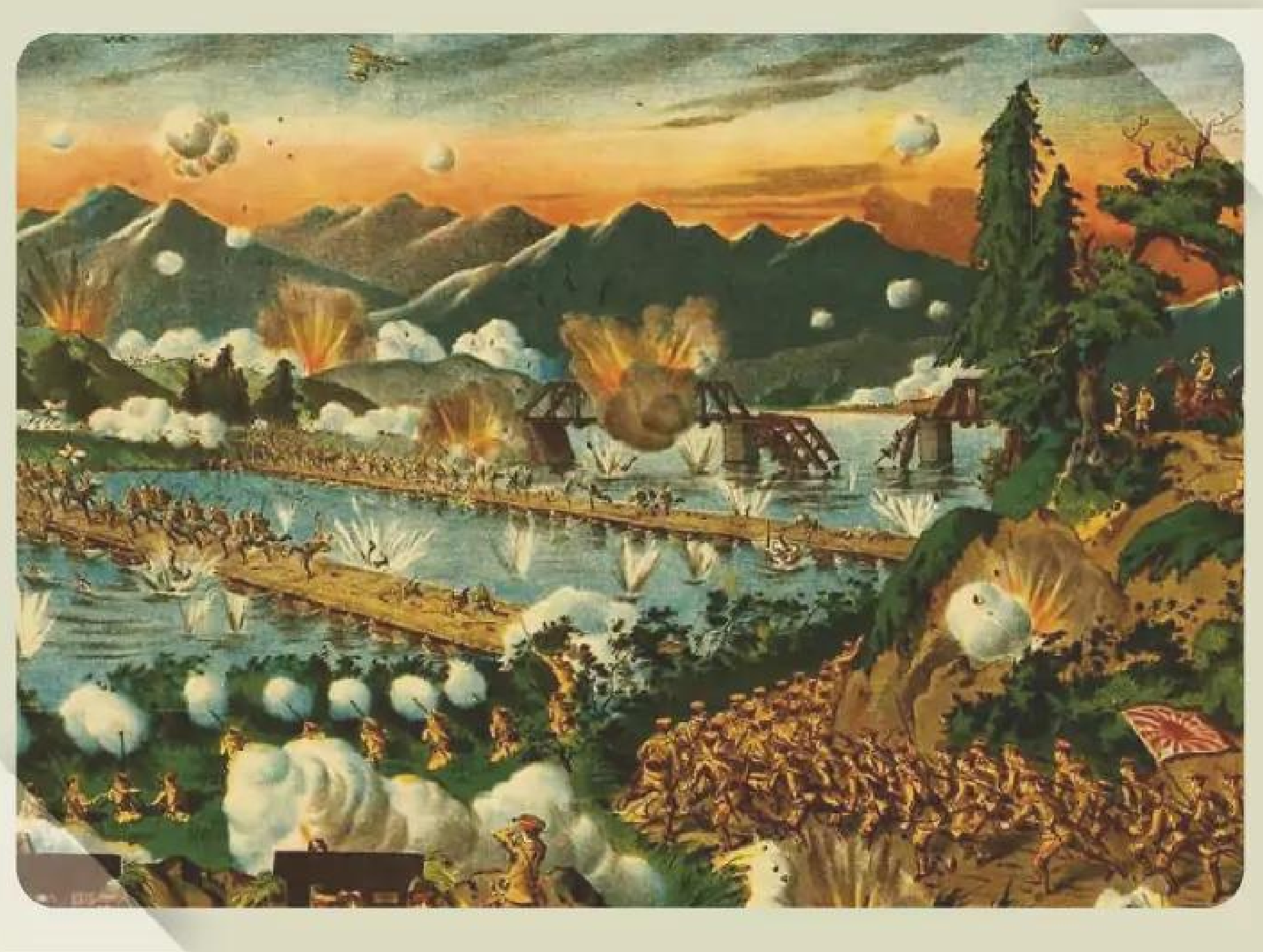
Although uniforms were made of wool, the soldiers still needed a coat and sheepskin vest in winter.

From 1915 hand grenades became a regular part of a British soldier's equipment.

Soldiers wrapped canvas strips around their calves – called "gaiters" – to support and protect their lower legs.

Soldiers' footwear was short leather boots.

MEANWHILE, IN CHINA



GERMANY'S ASIAN COLONIES FELL QUICKLY

When World War I broke out, Germany possessed smaller colonies in several places in Asia, including in China, New Guinea and on various Pacific islands like Samoa. Already by August 1914 New Zealand troops had captured German Samoa without major bloodshed. Three months later, Japanese and Allied forces occupied Germany's Chinese colony of Tsingtao. German soldiers were interred in Japanese prison camps until peace.

teeth into it. Sometimes if they shelled the supply lines you didn't get anything for days on end". In April 1917, bread rations also shrank, and the gunner described how soldiers sometimes had to keep their energy up without any food at all. The lack of food in the trenches was most often due to supplies being lost on their way to the front after the supply lines had been attacked.

The British Army tried stubbornly to hide the lack of food from the enemy, but when army command informed the public that they were serving two hot meals a day, they received over 200,000 angry letters from soldiers who'd had a somewhat different experience of their diet out in the field. The soldiers recounted how the officers were well-fed, while the men in the trenches suffered miserable lodgings.

The food supply was most difficult when the soldiers moved into enemy territory. Here they had to largely survive on emergency rations, which typically consisted of the salted canned meat, a piece of cheese, 350 grams of biscuits and a sealed container of tea, sugar and a pair of stock cubes.

The amount of emergency rations a soldier could carry on his back did not sustain him for many days. If the kitchen crew failed to ship supplies into a newly occupied area, the troops would have to abandon the territory and retire to their previous positions.

In areas where officers expected great difficulties in transporting supplies to, they could decide that supply budgets could bring the soldiers extra rations, which they'd cook in the trenches in place of receiving ready-made meals. It was – after all – easier to bring packs of canned meat with them than expect food couriers to run over the battlefield with soup sloshing in a container on their backs.

SLIGHTLY WOUNDED HAD PRIORITY

If the transport of food and fresh troops to the front was a challenge, it was a much larger logistical challenge to transport wounded soldiers away from the battlefield and up to field hospitals. It was often critical to an injured man's survival that he receive quick treatment. Still, soldiers had to wait hours or even days from the moment they were wounded on the battlefield until they lay in bed at the field hospital.

Soldiers with minor cuts and injuries fought their own way back from the battlefield, while the more seriously injured had to wait for stretcher bearers to pick them up. The bearers were constantly running to and fro, and often had to turn a blind eye to those left writhing in pain on the ground. Their orders were to first transport the lightly wounded soldiers who had the greatest chance of returning to the battlefield.

Transport from the battlefield and first-aid posts in the trenches to the

A chaplain speaks to wounded soldiers at a Russian field hospital at the town of Suwalki, where several fierce battles were fought on the Eastern Front.

improvised emergency clinics – the so-called "Main Dressing Stations" around 1.5 kilometres behind the front – was often by horse-drawn wagon. The wounded soldiers bounced from side to side on the truck when the vehicle jolted over shell holes in the muddy soil or bombed ruins. Along the way, the threat of bombings and attacks continued to hang over the wounded.

Bottlenecks

Even when patients arrived at the makeshift clinics and field hospitals, they were not guaranteed treatment. The wounded from major battles – such as the bloody offensive by the River Somme in the second half of 1916 – filled the limited amount of sick beds or gurneys and sheer congestion meant that the unfortunate would have to wait or perhaps even die on the bare ground.

1,800,000
litres of water were consumed by Allied troops in the Middle East on a daily basis.

The badly wounded who could still be saved were transported to hospitals in their home country. Throughout the war the Allies established several military hospitals in France, partly to avoid the threat of German submarines during transportation to Britain, and partly to make it quicker to send the soldiers back to the front once they'd recovered.

To keep track of the wounded, soldiers were equipped with a so-called tally card – a special identification card where medical officers wrote the patient's diagnosis and treatment. If the injured was unconscious, doctors could identify the soldier by this tag. The card followed the soldier all the way to the field hospital or to the hospital in his home country to ensure that he got the correct treatment.

Penicillin hadn't yet been invented in World War I, and so many soldiers died from infections. When nothing else helped, powerless doctors could only soothe the soldiers' pain with morphine until they died.

Though many soldiers died during their hospitalisation, figures from the Royal Army Medical Corps reveal that 169,842 wounded soldiers returned to service in the hell of the trenches after treatment. By comparison, 36,879 men died while being treated for their injuries.

When Allied troops received the news that the Germans had surrendered on 11th November, 1918, they couldn't simply thank their comrades in the trenches. Behind the victory was an equally relentless army of cooks, food couriers, railway engineers, mechanics, stretcher bearers, drivers, field doctors and nurses, who for more than four years had kept the war machinery going. They had taken care to bring soldiers to the right place and had helped to keep them alive on the battlefield. ■

EVACUATION CHAIN

FROM FIRST AID TO THE HOSPITAL

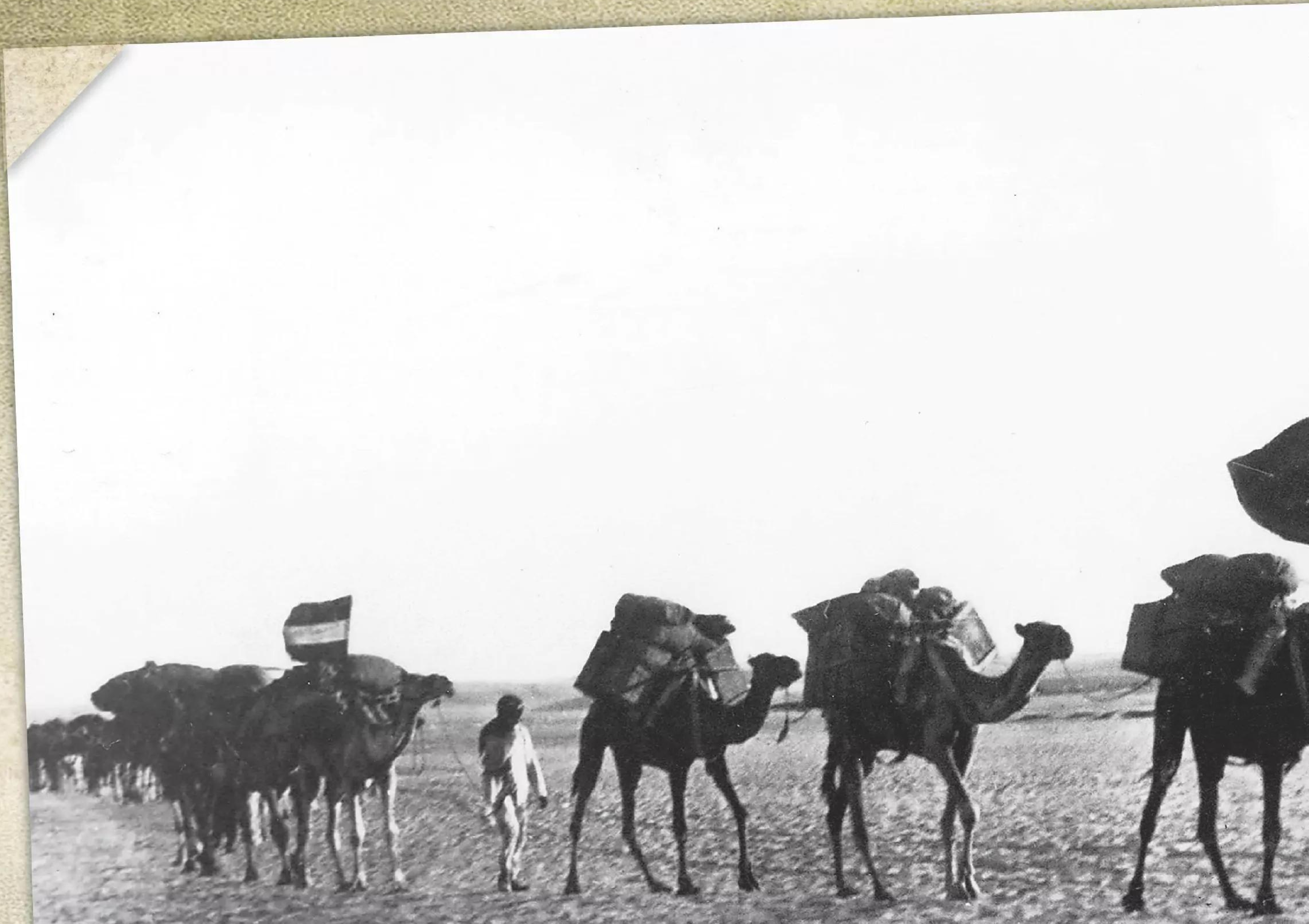
The evacuation of soldiers from the battlefield to a field hospital or back home followed a fixed pattern.

First aid: slightly injured soldiers fought their own way from the battlefield to a first-aid post – known as a Regimental Aid Post – where their wounds could be attended to. Soldiers with more serious injuries had to wait to be picked up by stretcher bearers, which could take hours.

Emergency treatment: the injured could be ferried from the first-aid post to an Advanced Dressing Station – a makeshift clinic – a few hundred metres behind the trenches. Here medical staff were able to perform minor emergency surgery, such as amputations. If the wounded could not return to his unit, he was ferried to a Main Dressing Station, where he could stay for up to a week.

Field Hospital: if the patient was not combat-ready after a week, he was transported on to the Casualty Clearing Station – a field hospital – where staff could treat and nurse soldiers for up to a month. Field hospitals offered major surgery.

Hospital: the most seriously wounded were ferried by ambulance train or barge to a general hospital or a clinic converted from hotel, casino or the like. If the patient required further specialised treatment, he travelled back home.



IN UNFAMILIAR TERRAIN

War between Europe's biggest powers quickly spread to the colonies in Africa and Asia. When the Ottoman Empire and Italy entered the war on either side, the bloody battle also spread to the Alps and the Middle East where soldiers were sent on dangerous missions in unfamiliar terrain – through the Sahara's burning sand, into Africa's humid jungle and the Alps' snow-capped peaks.

Caravans: *camels often replaced horses as an army's mode of transport: for example, in Egypt, where the Allies tried to defend the Suez Canal against Ottoman attacks.*

Artillery: *Ottoman soldiers defended themselves with German artillery against the Allies who marched through Mesopotamia to capture the area's precious oil sources.*

Gallipoli star: *heroic Ottoman soldiers were decorated with a Gallipoli star. The medal was introduced during the Battle of Gallipoli in 1915, when the Ottomans triumphed.*

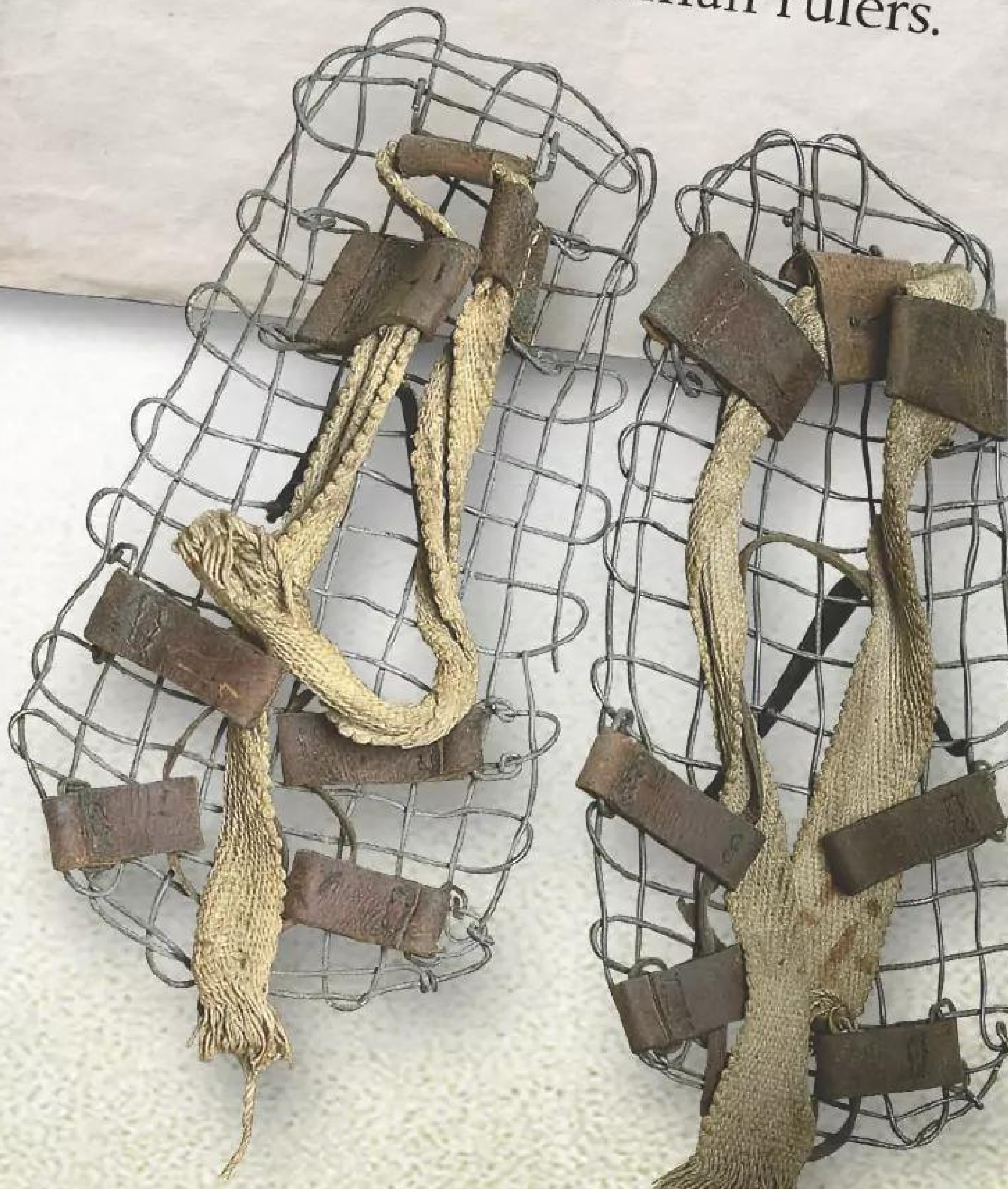
The Dead Sea: *the trench war also spread to the Middle East where Ottoman and Allied soldiers fought for control of Palestine at the Dead Sea.*

DESERT WAR

■ Hoping to regain former glory, the bankrupt Ottoman Empire sided with the Central Powers. The Middle East was turned into a battlefield. Although Allied soldiers fought in an unfamiliar desert landscape, they managed to advance through Palestine and Mesopotamia. Meanwhile Armenians, Arabs and Kurds exploited the war to revolt against their Ottoman rulers.

Improvised barbers: *even with the desert war's primitive conditions soldiers made time for a haircut and shave.*

Lawrence of Arabia: *Welsh archaeologist Thomas E Lawrence was a British intelligence officer and led an Arab revolt against the Ottomans.*



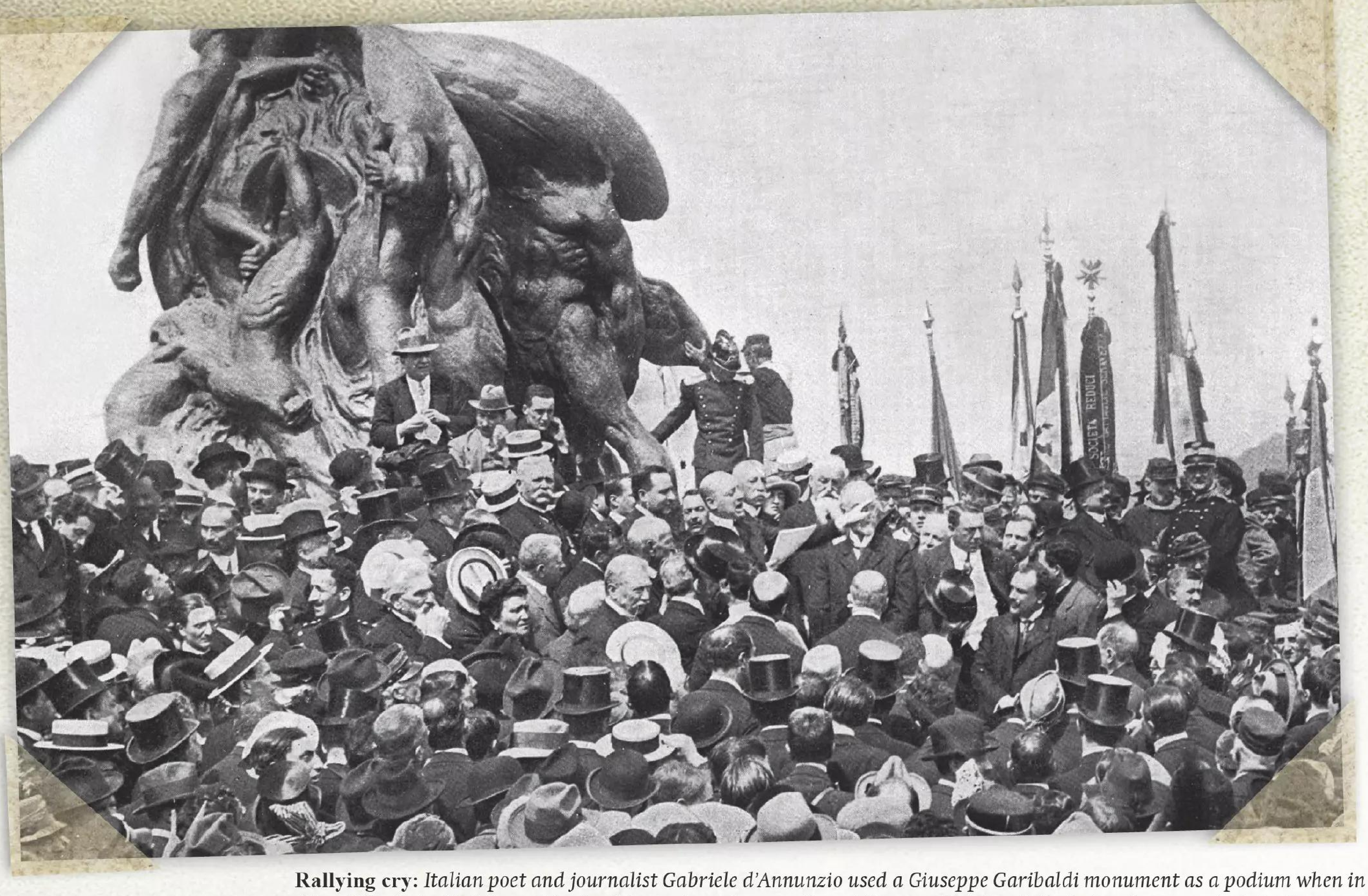
Desert shoes: *long walks in the desert tired soldiers. Sand shoes that buckled outside the boots distributed weight so that the soldier did not sink into the sand.*

HELP

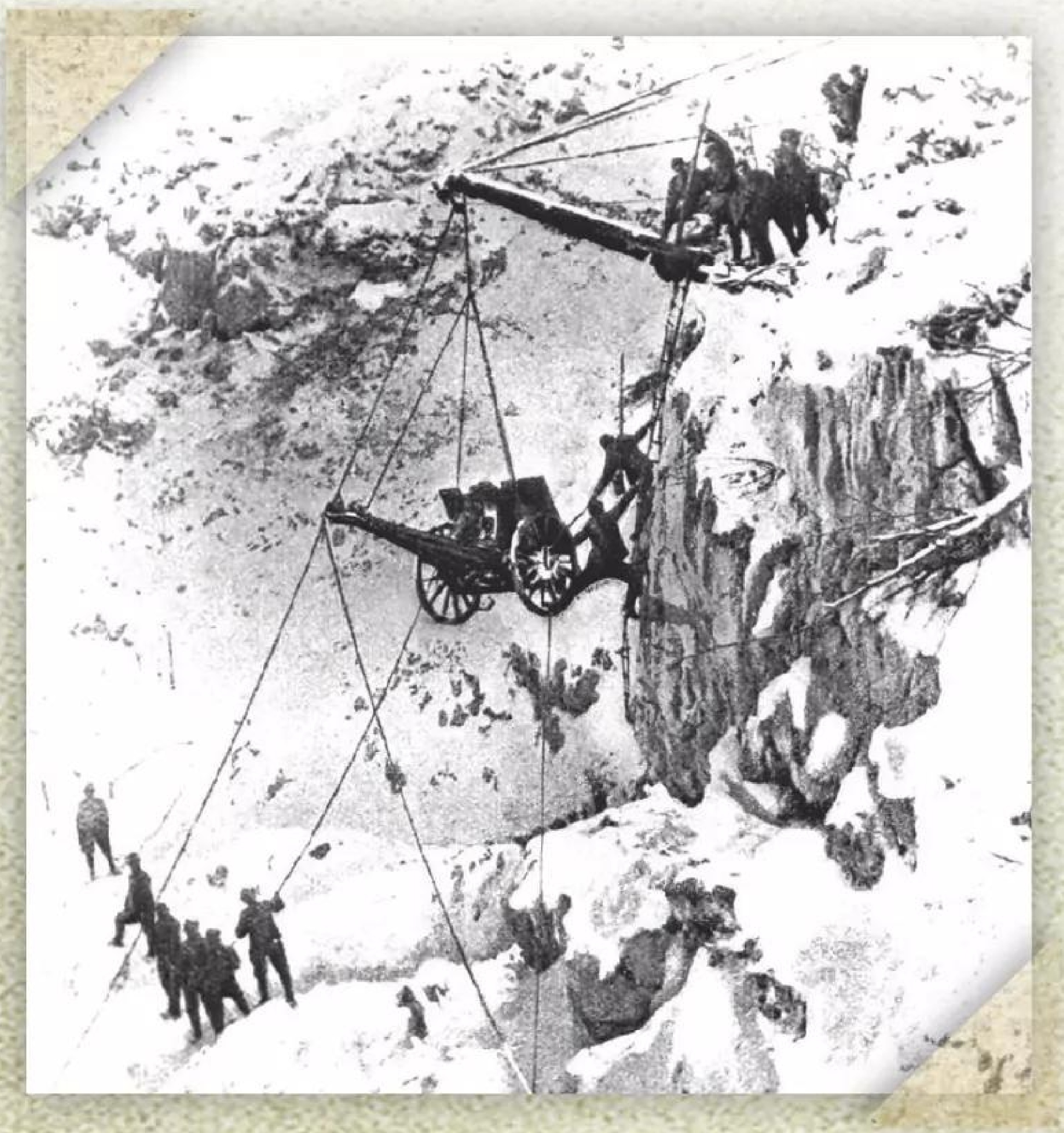
The Allies were assisted by soldiers and local workers from their colonies all over the world: especially Africans, Indians and Chinese.

A total of 1.3 million Indian soldiers fought in the war; many because of the wages.

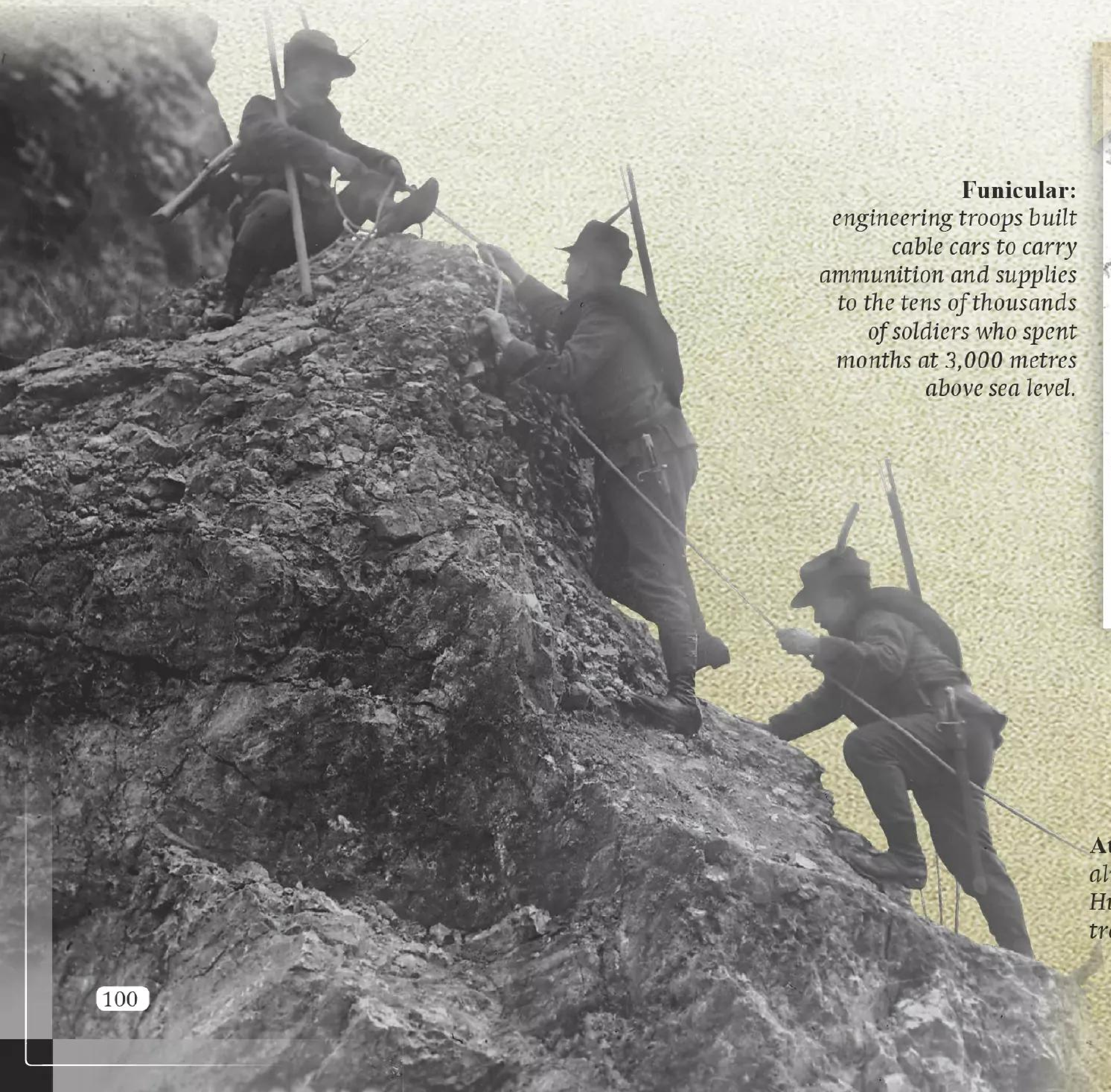
Despite a small population of only five million, Australia provided 322,000 volunteer soldiers.



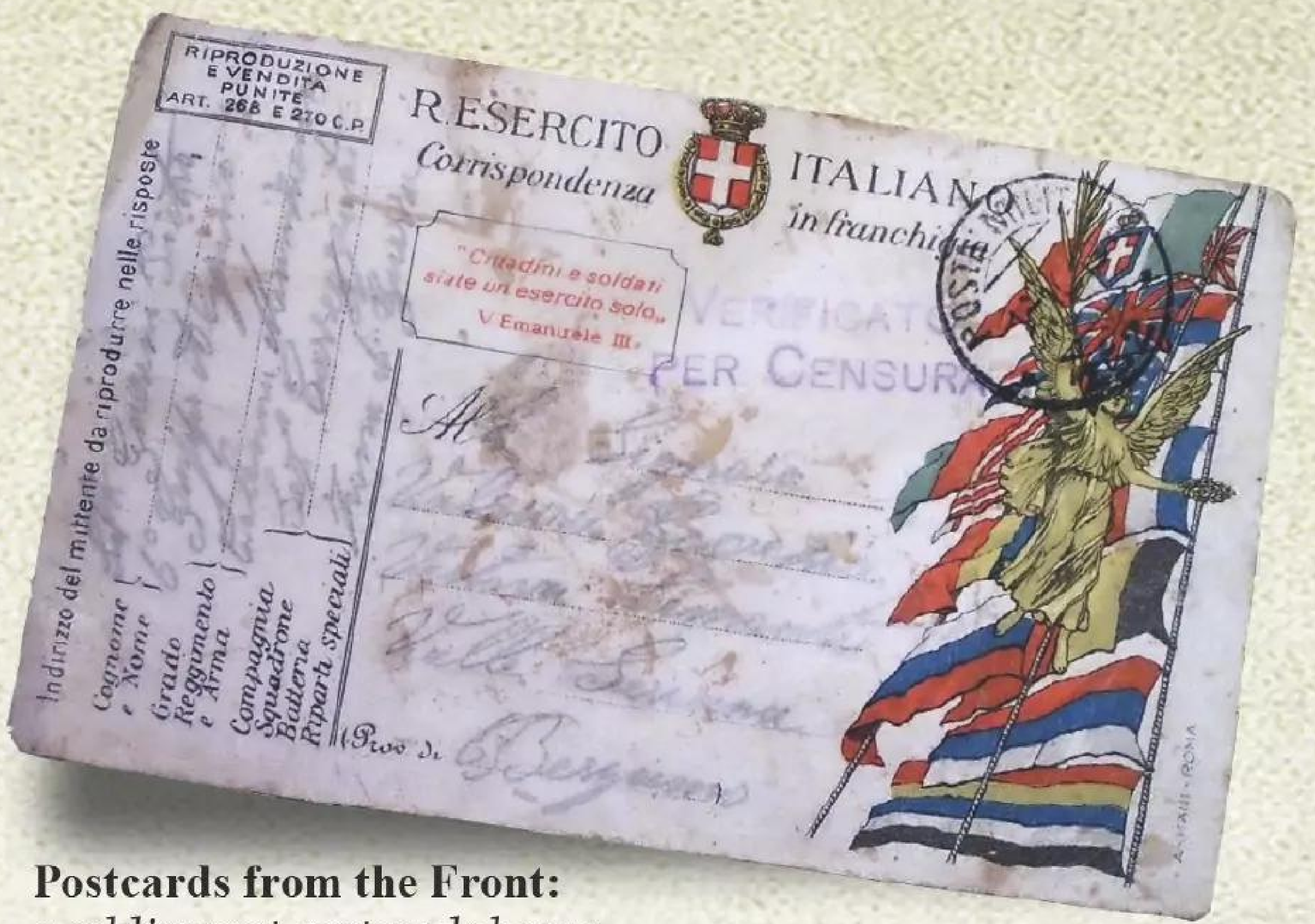
Rallying cry: *Italian poet and journalist Gabriele d'Annunzio used a Giuseppe Garibaldi monument as a podium when in May 1915 he incited the residents of Genoa to go to war. Almost three weeks later, Italy declared war on Austria-Hungary.*



Funicular: *engineering troops built cable cars to carry ammunition and supplies to the tens of thousands of soldiers who spent months at 3,000 metres above sea level.*



At the top: *steep mountain sides accounted for almost the entire front between Italy and Austria-Hungary, so specially trained Italian mountain troops, the so-called Alpini, were highly prized.*



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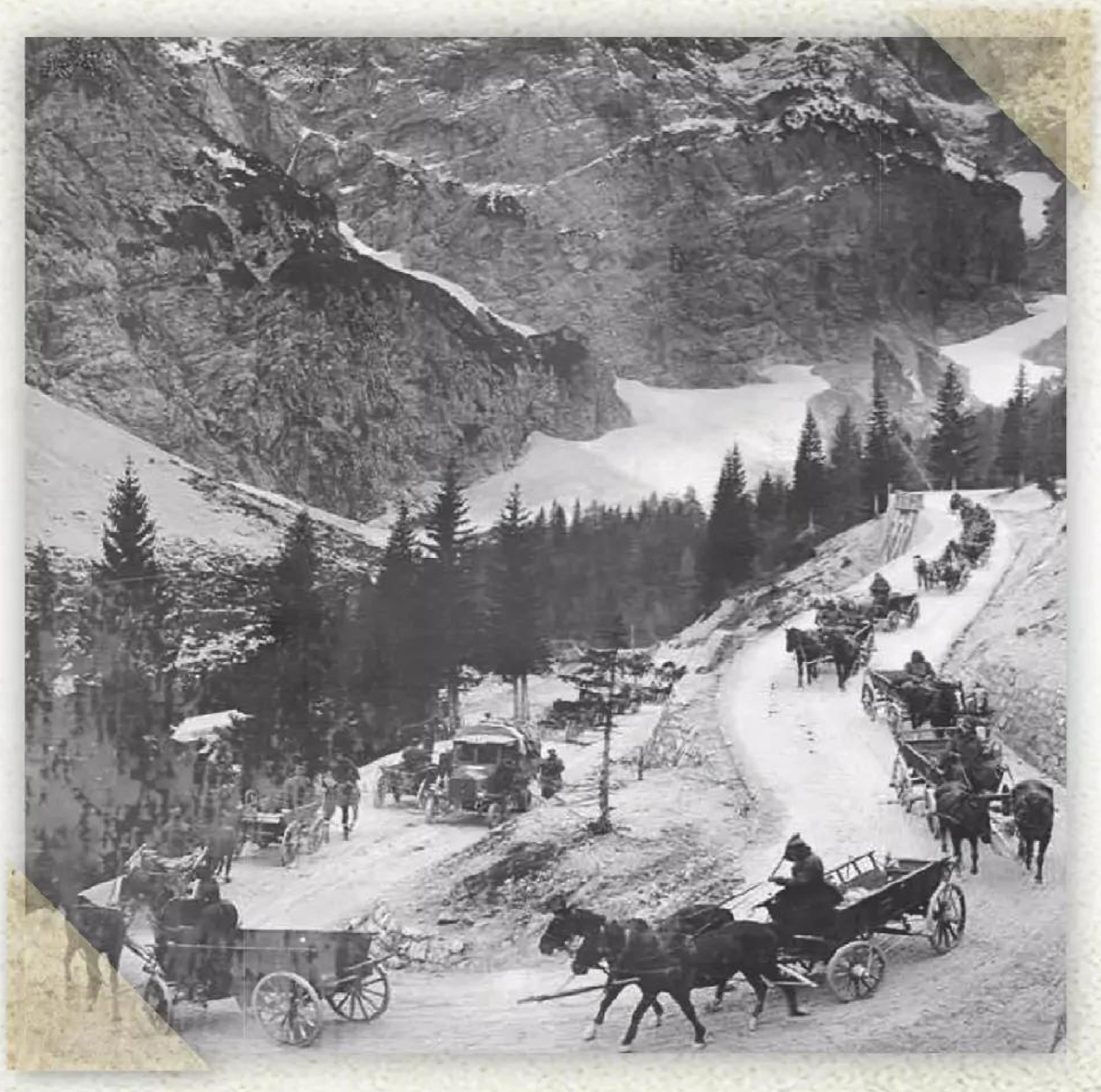
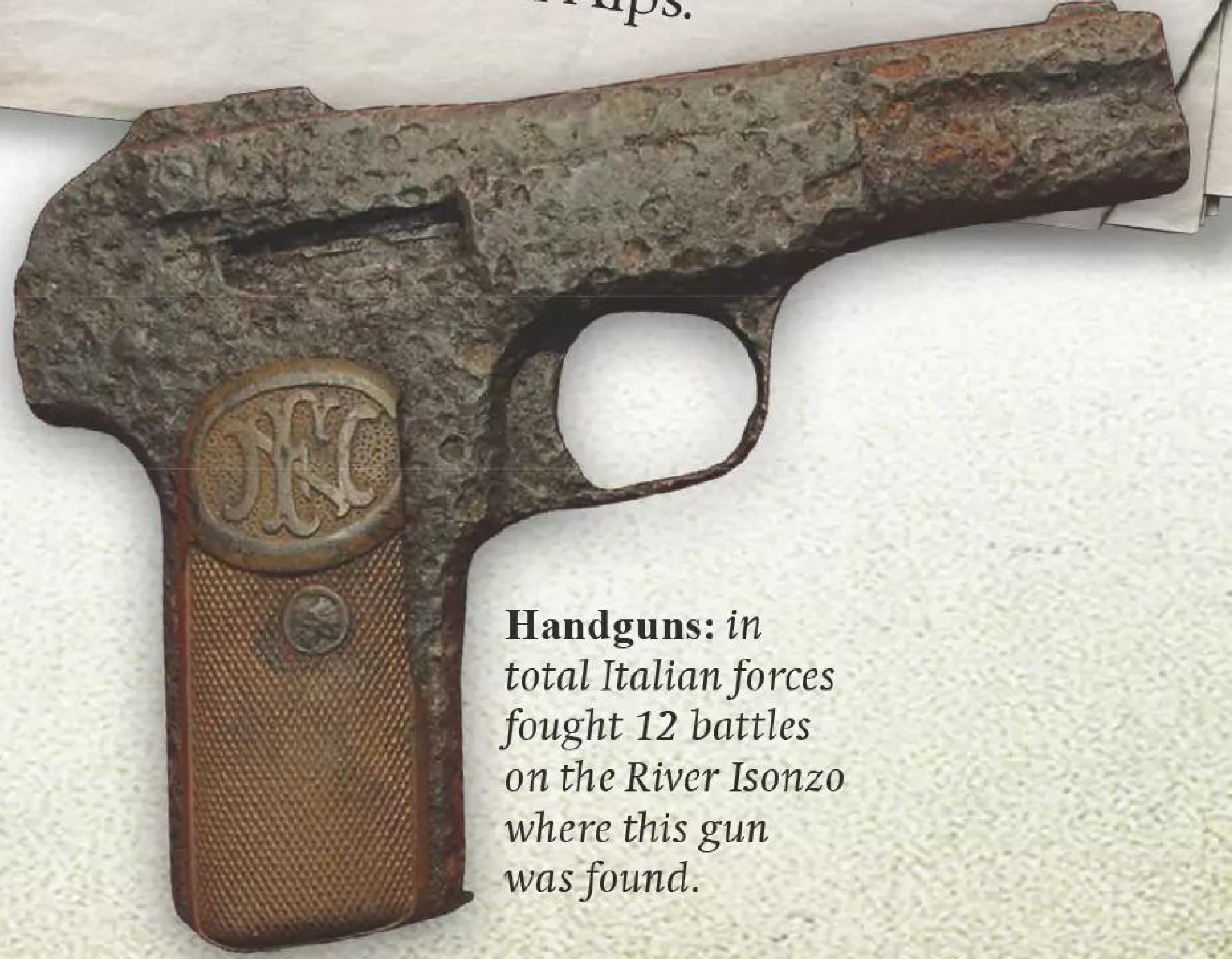
Postcards from the Front: *a soldier sent postcards home from the war in the Alps.*

ALPINE FRONT

■ On 26th April, 1915 Italy joined the Entente Powers, and war broke out in the Alps between Italy and Austria-Hungary. The desire to conquer the mountain peaks so they could be used as strategic gun emplacements prompted soldiers to climb higher and higher to the top of the snowy mountains. The supply of food, weapons and fuel to heat the mountain camps put creative engineers to work – they constructed 530 cable cars in the Italian Alps.



Through Pass: *alpine mountain passes served as a supply line for military posts. Here an Austro-Hungarian caravan carries supplies to the soldiers during a battle at River Isonzo in 1917.*



Handguns: *in total Italian forces fought 12 battles on the River Isonzo where this gun was found.*

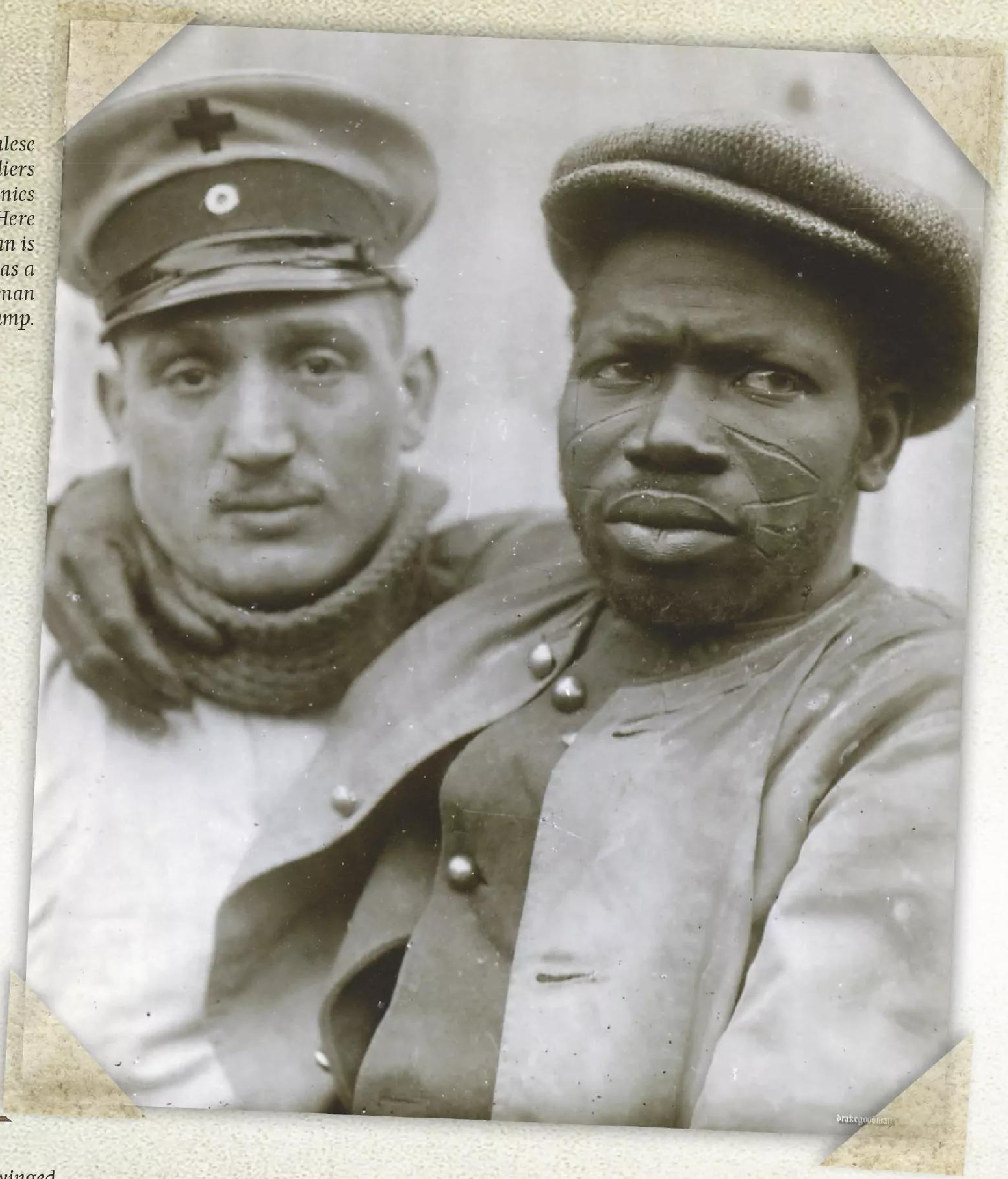
VEHICLES

Sure-footed military dogs pulled wagons with Italian soldiers' supplies and artillery through the mountains.

The Italian armoured car Lancia IZM found it difficult to climb the Alps.

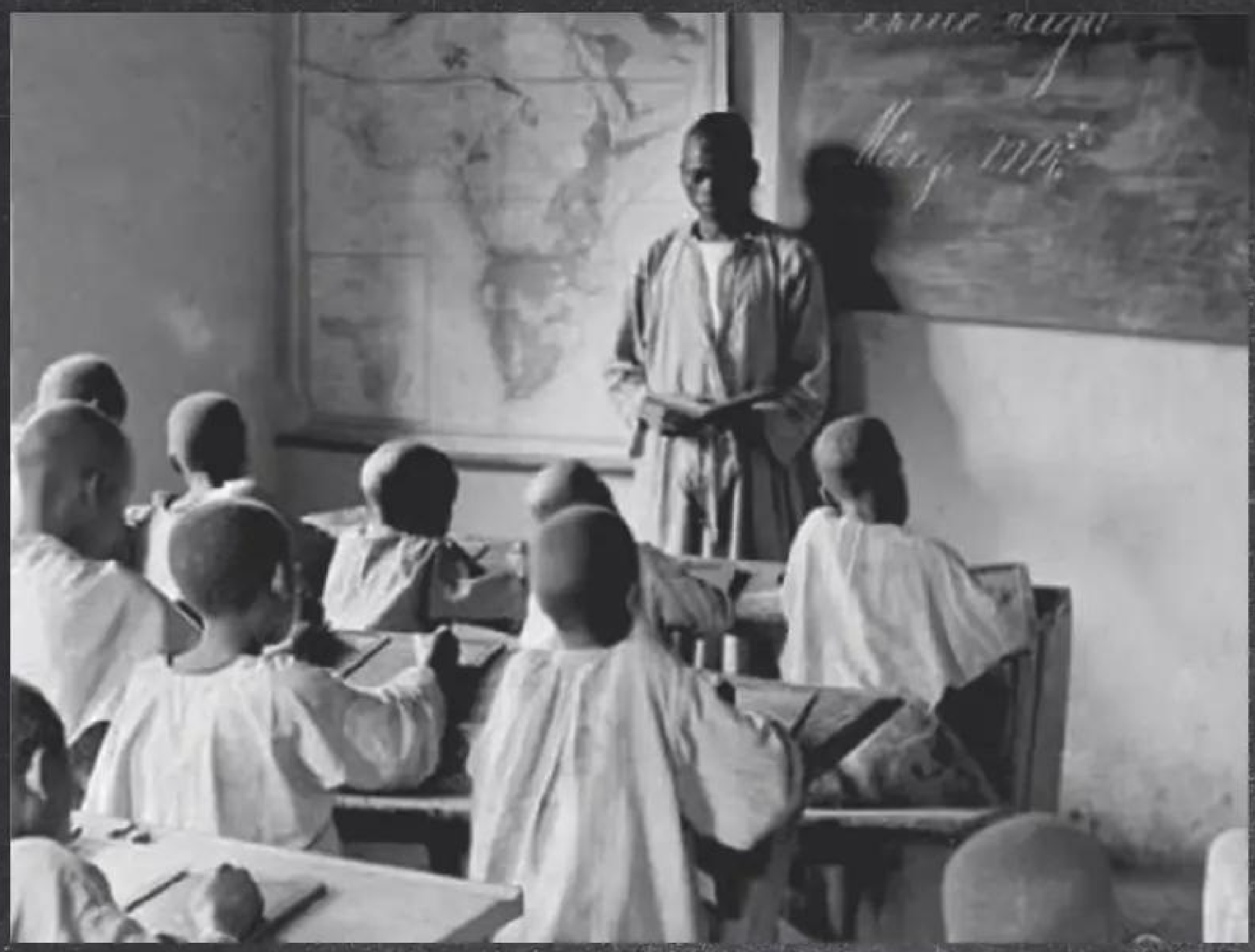
Italian soldiers had to carry their military bikes on their back when going uphill.

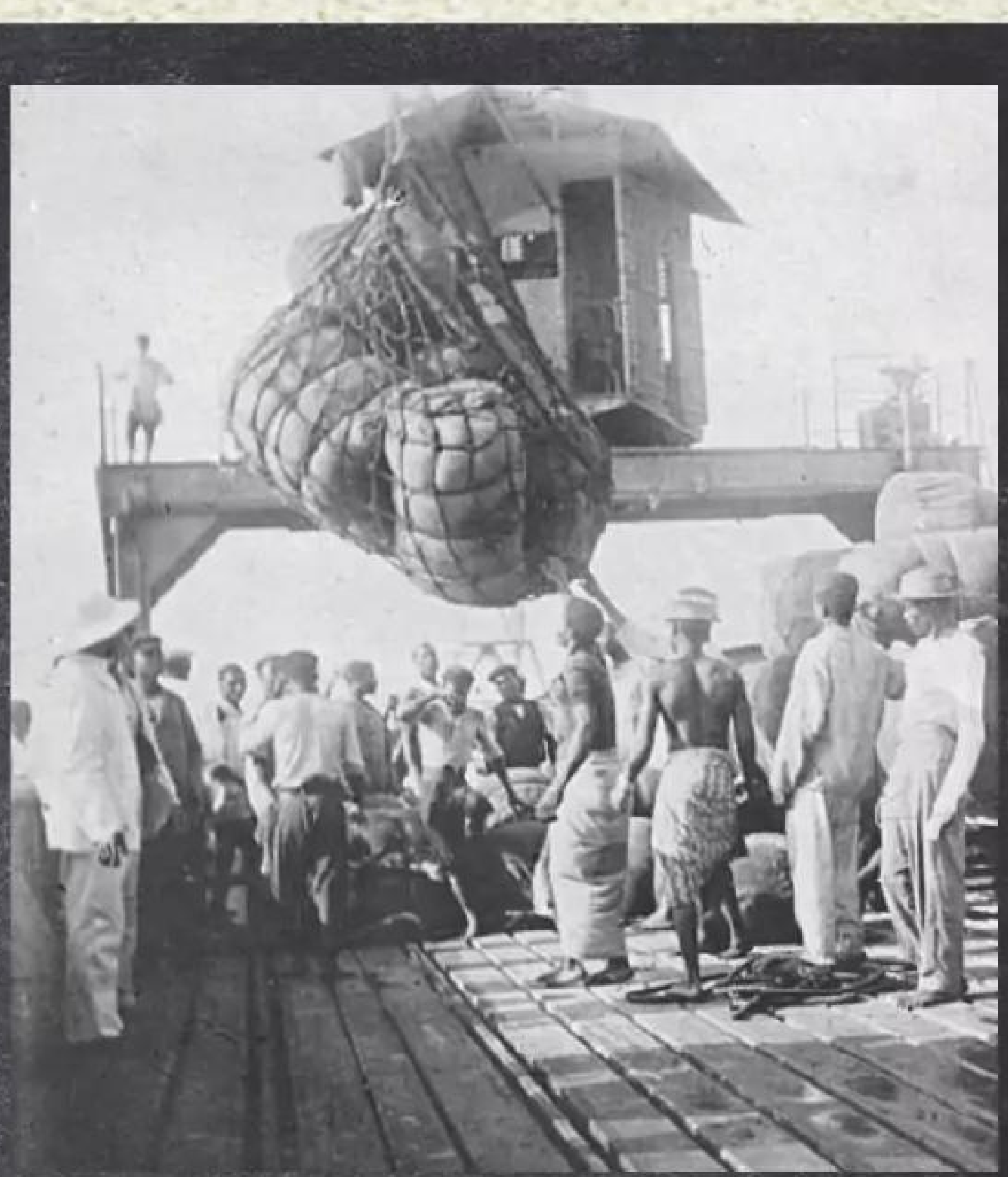
POW: *the term "Senegalese infantrymen" covered soldiers from French colonies throughout West Africa. Here a Senegalese infantryman is carried to a glory hole as a prisoner of war in a German military camp.*



German East Africa: *a soldier replaces a horse with a bull during the fighting in German East Africa that lasted throughout the war.*

Tsetse fly: *the winged scourge was a bane to soldiers and especially horses.*





COLONY

German colonialists created functioning schools for African children. The German word "Schule" is still used in Swahili.

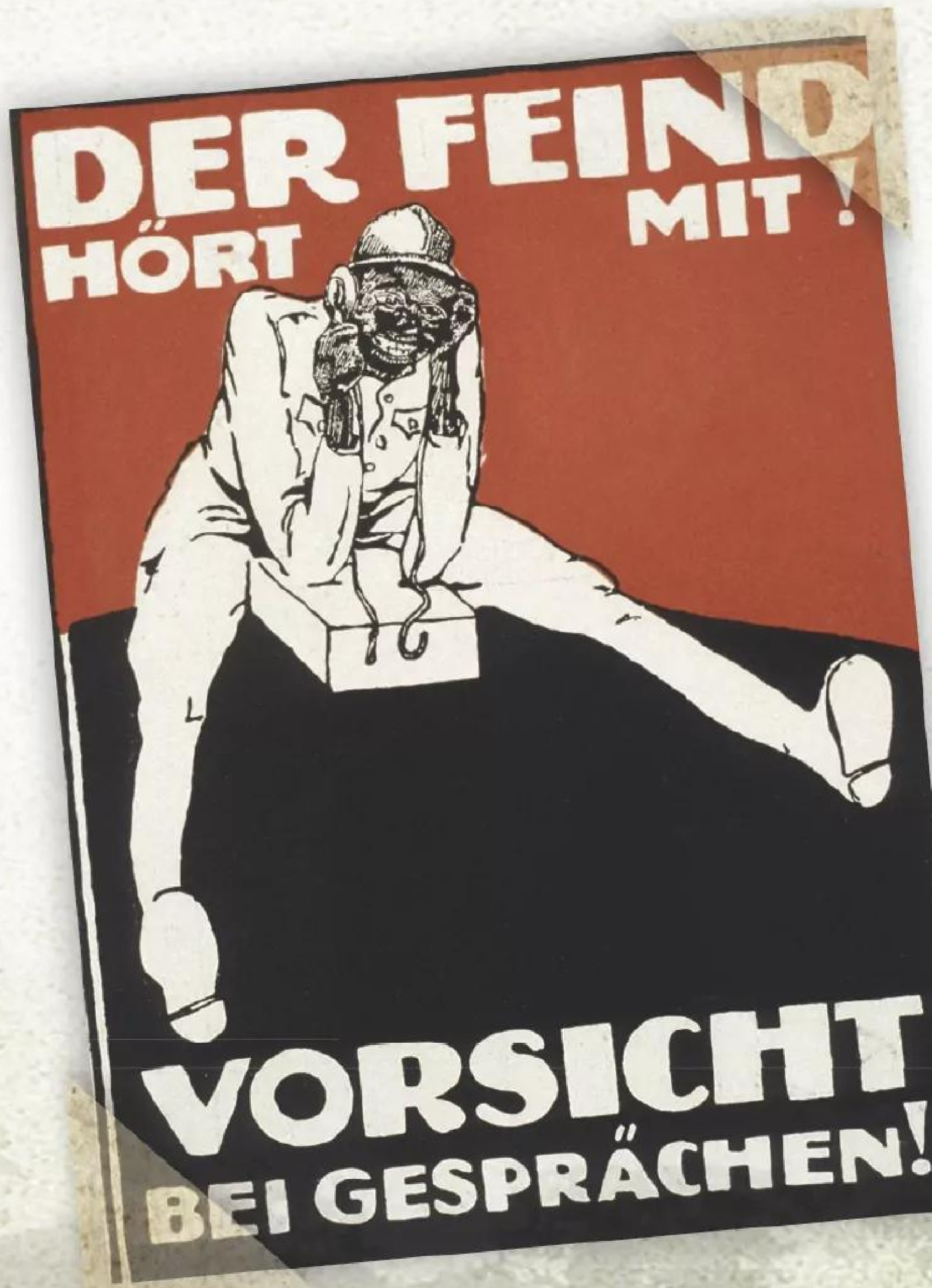
The colonies in Africa supplied Germany with commodities like coffee, cocoa, cotton and bananas.

The Germans perfected a network of bridges, roads, railways and sea ports.

Bush war: *German General Paul von Lettow-Vorbeck (second from right) led a guerrilla war in German East Africa and remained unbeaten until 1918. Among other things, he lured the Allies into areas plagued by tsetse flies.*

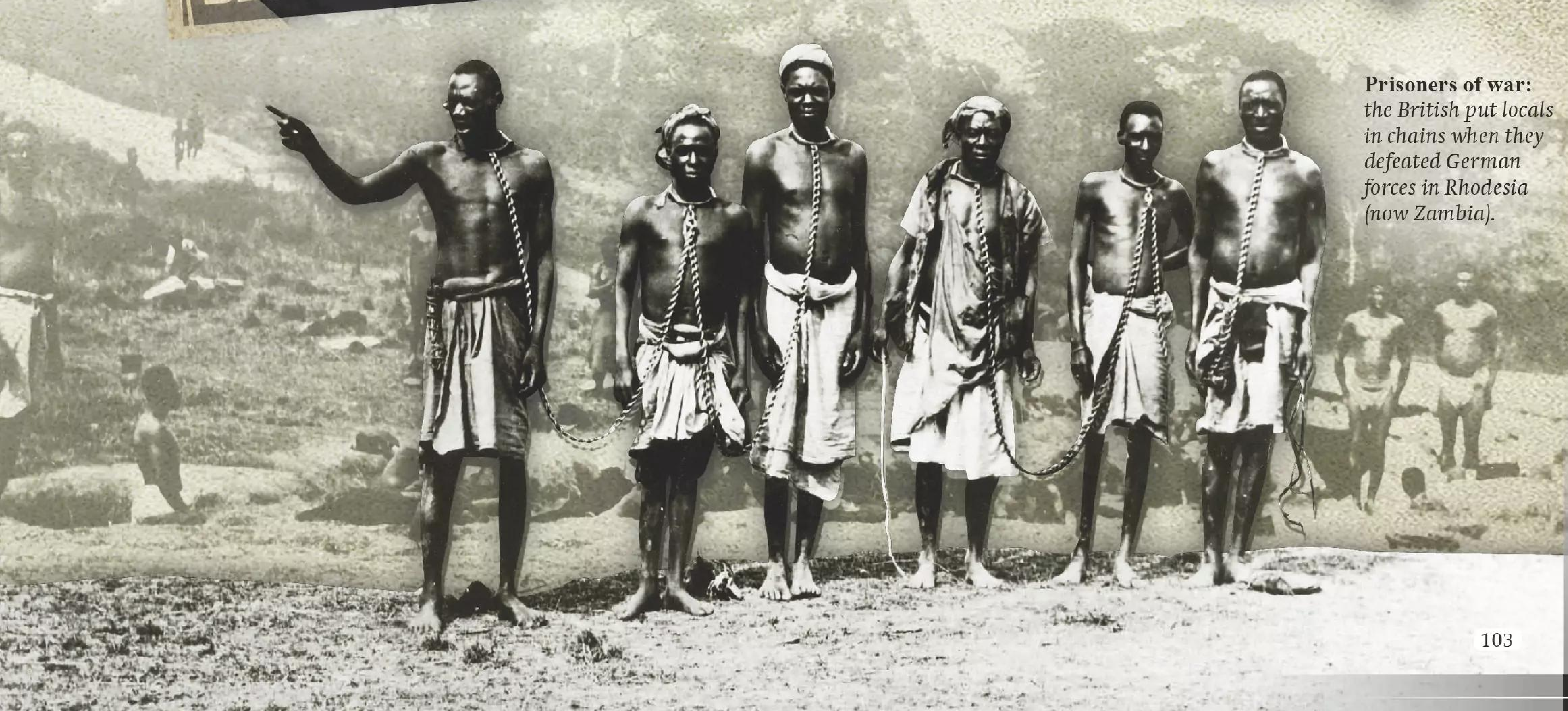
BATTLE FOR AFRICA

■ Germany's African colonies – Togo, Cameroon, German East Africa and German South-West Africa – were all surrounded by enemy colonies. When war broke out, the Allies attacked the colonies, which supplied Germany with raw materials. The biggest threat to the soldiers turned out not to be enemy gunfire, but greater issues of hunger and large swarms of deadly tsetse flies.



Spy fear: *German propaganda posters warned against listening spies among African soldiers.*

Thirst: *in the Kalahari desert, a field bottle was the most important part of a soldier's equipment.*



Prisoners of war: *the British put locals in chains when they defeated German forces in Rhodesia (now Zambia).*

USA TURNS THE WAR

1917-1919

In April 1917 a secret telegram and escalating submarine warfare leads the US President to declare war on Germany. The Americans proved to be a breath of fresh air in the stagnant war for the exhausted European soldiers who'd fought in the trenches for years. The soldiers arrived well-fed and with no concept of battlefield horrors – their fighting spirit helped turn the war. At the end of the war, the Treaty of Versailles left Germany impoverished and confused. New conflicts lurked in the wake of peace.

1917-19

1917: US President Wilson decides the US will go to war in April.

1917: the first American troops land in Europe in June.

1918: American soldiers fight first battle as an independent unit at Saint-Mihiel.

1918: Germany surrenders on 11th November.

TREATY OF PEACE

1919: German government signs the Treaty of Versailles.

1917 1917 1918 1918 1919

On Monday 2nd April 1917, at 20.20, US President Woodrow Wilson moved from the White House out into the rain and a waiting car that would drive him to Capitol Hill. For over two years he had argued strongly for keeping his people out of the European killing fields, but now Wilson proceeded to ask for Congressional support to go to war.

"America is privileged to spend her blood and her might for the principles that gave her birth and happiness and the peace which she has treasured", said the president's inflammatory speech from the Congressional podium. In the hall the audience responded with standing ovations.

"My message today was a message of death for our young men", Wilson was overheard saying later at the White House. "How strange it seems to applaud that".

News spread that evening

The very evening that Wilson had spoken in Congress, US newspapers hurried to print special editions about the Americans going to war – a message that sparked widespread jubilation.

During the interval at the New York opera there was a rush onto Seventh Avenue to buy the special edition of the *New York Evening Telegram*, which had been printed on pink paper.

"It was the most unusual sight, looking down from our box, to see every fourth or fifth person sitting in the orchestra… reading a pink newspaper!" recalled one opera guest. "After the opera was over the curtain went up again. The audience all stood, the entire cast appeared and led by them the audience joined in singing the 'Star-Spangled Banner'".

Four days later, the United States declared war against the German Empire.

Telegram had threatened United States

Five months earlier Wilson had been re-elected as president by promising that America was not going to war. But the Allied crisis on the Western Front and German attacks on US merchant fleets had changed the Americans' attitude towards World War I.

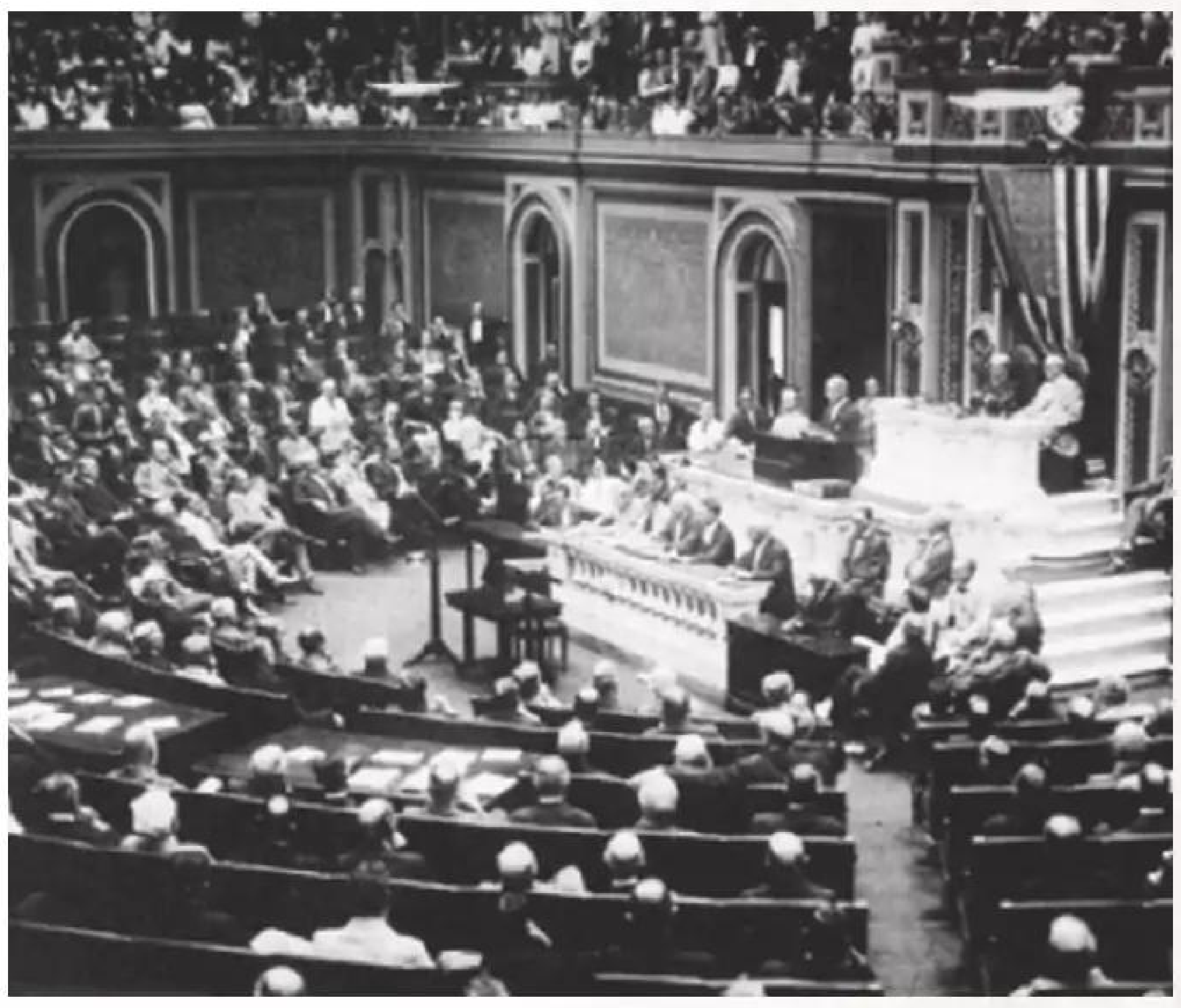
The sinking of US cargo ships prompted US President Woodrow Wilson to finally declare war on Germany.

In February 1917 the German navy had resumed the so-called unrestricted submarine warfare that allowed German U-boats to attack all Allied vessels without warning.

The Americans had not forgotten that in 1915 this type of submarine warfare had sent passenger steamer *Lusitania* to the bottom of the sea along with 1,198 passengers, including 128 Americans. Now German subs threatened again.

At the beginning of 1917, President Wilson had also received a secret telegram that had been intercepted by British intelligence from the transmission cable across the Atlantic.

The telegram had been sent by German foreign minister Arthur Zimmermann to the German ambassador in Mexico.



On 2nd April, 1917 the US president, Woodrow Wilson, asked for Congressional support on going to war – and got it.

Zimmermann offered the Mexican Government money and German support to conquer the US states of Texas, Arizona and New Mexico if Mexico, in turn, would ally itself with Germany in the war against the United States. The offer was a serious threat to the US and motivated the President to go to war.

Young saw war as an adventure

When the US military began its campaign, hordes of excited young American men – like the Europeans in the summer of 1914 – flowed to recruitment offices. Many had never heard of the bloody, muddy hell that was the trenches and imagined war as a chance to get away from the tedium of everyday life.

Sergeant William Langer remembered almost no serious discussion about the war among the soldiers: "Most of us young, were simply fascinated by the prospect of adventure and heroism… Here was our one chance for excitement and risk".

In May of that year, the US imposed military service and before World War I was over, American men aged over 20 had undergone military training. But not everyone had the patience to wait for an invitation from the army.

Lieutenant Milton Bernet said he signed up "not because I was intensely patriotic but simply because… waiting for the publication of those lists would have set me crazy".

The Americans landed

The European Entente powers had to wait for America's backing. In April 1917 the US Army and National Guard totalled 200,000 soldiers, but they were not equipped or trained in battle. Many recruits had just arrived in the United States as immigrants, and training in US camps consisted of everything from handling weapons to basic language courses.

However, at the request of France, the Americans agreed to send symbolic divisions in spring 1917. US supreme commander Major General John Pershing sailed into Boulogne-sur-Mer's port on 13th

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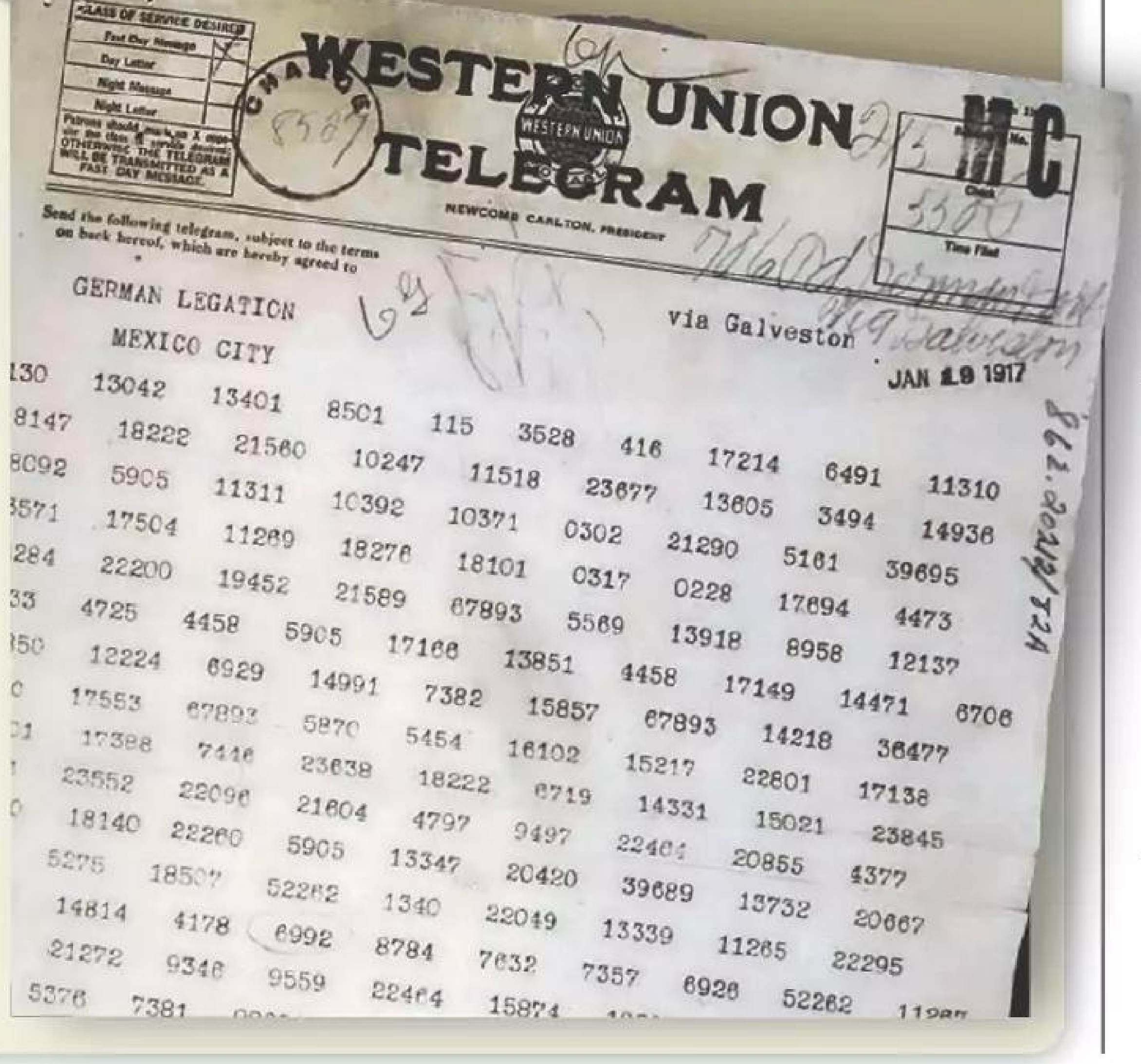
KEY MOMENTS

ZIMMERMANN TELEGRAM INCITED PRESIDENT

In January 1917 German foreign minister Arthur Zimmermann sent the German ambassador in Mexico a secret telegram with an offer: in exchange for an alliance, Germany would reward Mexico with riches and support the country in taking Texas, New Mexico and Arizona. British intelligence intercepted the telegram and sent it to the US president, who in April decided to go to war.



CLASS OF SERVICE DESIRED
Fast Day Message
Day Letter
Night Message
Night Letter
Patrons should mark an X opposite the class of service desired; OTHERWISE THE TELEGRAM WILL BE TRANSMITTED AS A FAST DAY MESSAGE

WESTERN UNION TELEGRAM
NEWCOMB CARLTON, PRESIDENT

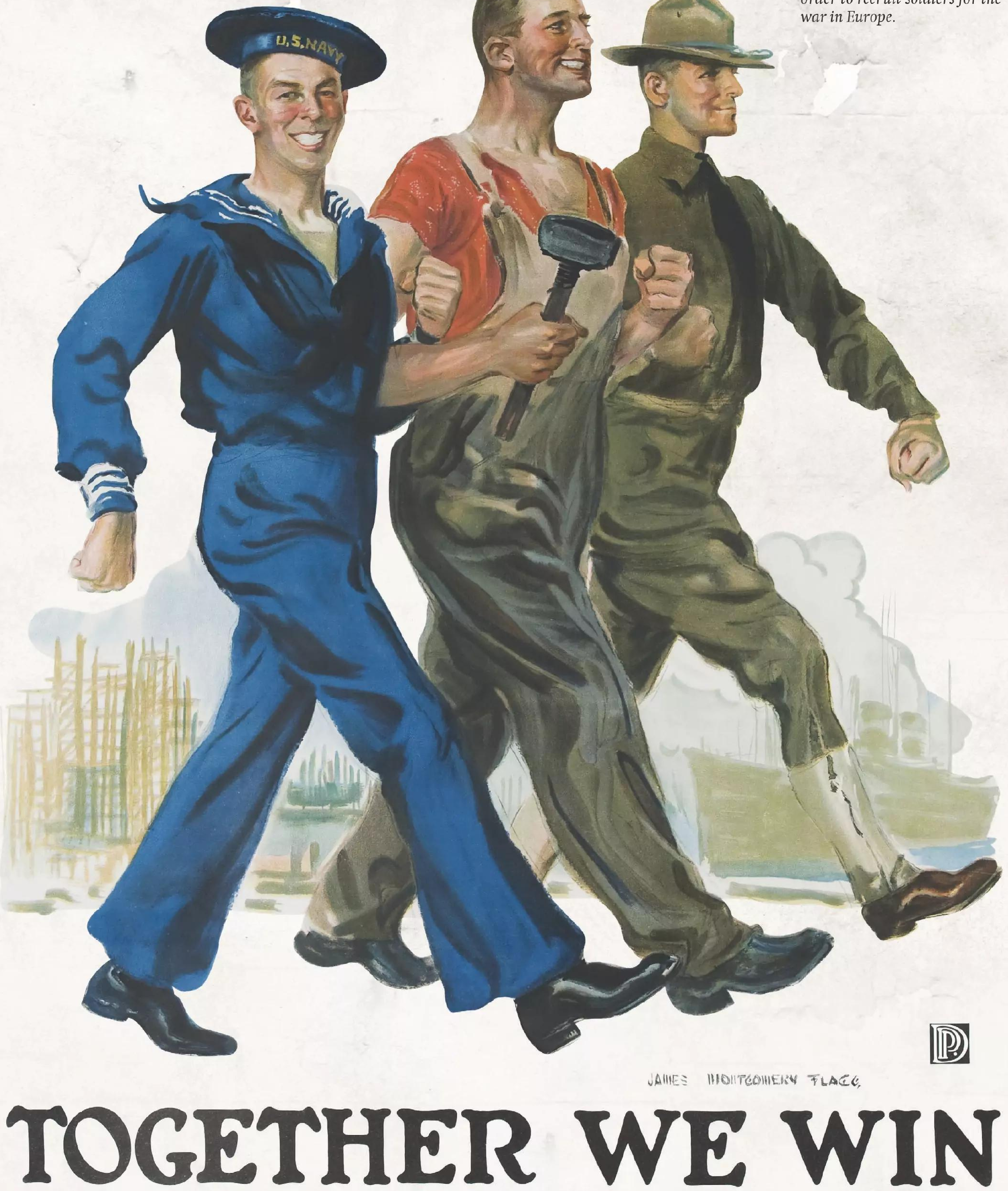
Send the following telegram, subject to the terms on back hereof, which are hereby agreed to

GERMAN LEGATION
MEXICO CITY
via Galveston
JAN 19 1917

13042 13401 8501 115 3528 416 17214 6491 11310
18222 21560 10247 11518 23677 13605 3494 14936
5905 11311 10392 10371 0302 21290 5161 39695
17504 11269 18276 18101 0317 0228 17694 4473
22200 19452 21589 67893 5569 13918 8958 12137
4725 4458 5905 17166 13851 4458 17149 14471 6706
12224 6929 14991 7382 15857 67893 14218 36477
17553 67893 5870 5454 16102 15217 22801 17138
17388 7446 23638 18222 6719 14331 15021 23845
23552 22096 21604 4797 9497 22464 20855 4377
18140 22260 5905 13347 20420 39689 13732 20667
5275 18507 52262 1340 22049 13339 11265 22295
14814 4178 6992 8784 7632 7357 6926 52262
21272 9346 9559 22464 15874

862.20212/72A

The United States introduced military service in May 1917 in order to recruit soldiers for the war in Europe.


U.S. NAVY
JAMES MONTGOMERY FLAGG
TOGETHER WE WIN
UNITED STATES SHIPPING BOARD
ISSUED BY PUBLICATIONS SECTION EMERGENCY FLEET CORPORATION PHILADELPHIA PA
EMERGENCY FLEET CORPORATION

ARRIVAL: John Pershing, commander of the US expedition force, arrived with the first troops in the spring of 1917. The general insisted that his soldiers were not sent to the battlefield with the demoralised French and British soldiers. Before going to war, the soldiers were to wait for reinforcements as well as being trained, and plans needed to be in place.

THOU SHALT NOT TAKE THE NAME OF THE LORD THY GOD IN VAIN

WAITING: the Christian YMCA organisation collected money to sweeten life in the military camps for American soldiers in Europe. The wait was taken up reading books in the YMCA's improvised camp libraries, which also had space for music and singing.

June, 1917 after two weeks of travel across the Atlantic.

When the soldiers arrived in Paris the following day they were met by jubilant women, children and wounded soldiers with flags in their hands. To the great disappointment of the French, the American soldiers were not enough to make a difference against the Germans, and Pershing had strict orders not to disperse his soldiers into British and French divisions. The American strategy was to expand the US Army in France to 24 divisions – equivalent to around one million men – and then actively take part in the summer of 1918 when they were sufficiently trained and equipped.

The eager US soldiers were installed in camps and spent their time carrying out military exercises under French and British leadership. They learned to dig trenches, throw grenades, use heavy machine guns and equip their horses with gas masks in case of a German poison gas attack.

When the first cold of winter blew over Europe, the American camps took things more seriously. The Spanish flu, which often led to pneumonia, struck some of the frozen soldiers, and the Americans had to bury many of their comrades in coffins covered in Stars and Stripes before their first battle.

WARNED ABOUT SOLDIER'S LIFE

Until the spring of 1918, General Pershing succeeded in keeping his troops away from the battlefield. But events on the Eastern Front changed the situation. The October Revolution in 1917 in Russia gave Bolshevik leader Vladimir Lenin power, and he promised the Russians peace. On 3rd March, 1918 Lenin signed a peace treaty with the Central Powers (Germany, Austria-Hungary, Bulgaria, and the Ottoman Empire), which suddenly gave the Germans a chance to redeploy troops from east to west. Submarine warfare had failed, and the Germans now hoped to break the stalemate on the Western Front with a series of massive offensives – known as the Spring Offensives – before fresh American troops began pouring into the continent.

Commander of the French Army Ferdinand Foch succeeded in persuading Pershing to let the Americans go into the field to help keep the village of Cantigny out of enemy hands. The American 1st Division went to the front north-east of Paris under French command. On 28th

American soldiers hurl grenades over the Austrian trenches at Piave in northern Italy.

FORWARD MARCH: in the summer of 1918 General John Pershing finally allowed his soldiers to take to the field. Despite training in military camps many of the new American soldiers had no understanding of the horrors of war and ran brazenly out over the battlefield where enemy guns mowed them down. Here at Verdun in France, the soldiers march past a bombed house where the Germans had arranged a lookout on the roof.

May, 1918 the eagerness of the German artillery was uninterrupted. It sounded like "the world turned into thunder", as one US soldier described their arrival at Cantigny on the Western Front. While German forces were moving towards the city behind a fog of poison gas, the Americans waited in the trenches – many terrified at the reality of the war. "It was the first time they'd been anywhere near heavy shellfire, and some of them just about went cuckoo… I won a bet that day. We used to size up the replacements and bet on how long they'd last in the lines. One man I'd bet wouldn't last more than two days was killed right there, first crack out of the box", said US Sergeant Dan Edwards.

TRIUMPHED WITH FIRST STRIKE

Even though many Americans were inexperienced in the field, they still brought a new energy to the war. Unlike the exhausted and starved European soldiers – who'd spent almost four years living their lives in inhospitable trenches – the Americans were well-fed and not yet broken by the horrors of war. With the backing of 12 French tanks, mortars, heavy artillery and flamethrowers the American soldiers managed to take Cantigny in a few hours.

Over 1,000 Americans were killed or injured, and although the victory had no major impact on the war, it resulted in several headlines across the Atlantic. General Pershing described the battle as an eminent action that had an "electrical effect" on his soldiers.

Before the Americans had the opportunity to celebrate the victory at Cantigny, the German Spring Offensive had already surprised the Allies at several other places on the Western Front. Soon the German front was at the Marne River, as it had been in September 1914, with Paris only 90 kilometres away.

300,000 MEN ARRIVED EVERY MONTH

From April onwards 300,000 US soldiers landed on the coasts of Europe every month, and during the summer of 1918 they took part in a series of victorious battles under Allied command.

General Ferdinand Foch designated the US 1st and 2nd Divisions for the first major coordinated counterattacks at the French commune of Soissons, and together the Allies and Americans recaptured the town. Both French and German soldiers later described their astonishment at the energy and enthusiasm with which the Americans moved forward in the field. Maybe because they did not understand the dangers that awaited them on the battlefield, many ran blindly straight into enemy gunfire.

"The new men of my company conducted themselves splendidly. Lacking the caution of the old timers, they crossed fire-swept areas without hesitation. I don't believe they recognised the buzz of rifle and machine gun bullets for what it really was", recalled US captain John A Ballard of the 2nd Division.

The Americans' fighting spirit and repeated victories against the German Spring Offensive also brought optimism back to the Allied soldiers.

"Our troops are doing fine work. They gave the Hun the hard knock of the last few days. The success in this particular has had a very good effect materially and psychologically. The spirit of everyone is away up", commented US Lieutenant Hugh Drum from French forces headquarters.

THE GERMANS' LAST ATTACK

The Germans' final attempt to break through the Western Front and seize the initiative occurred at the war's Second Battle of the Marne – the first had been fought between 6th-12th September, 1914, and the second took place from 15th July to 6th August, 1918. After losing 168,000 soldiers, German general Erich Ludendorff

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TECHNOLOGY………… CULTURE…………… ECONOMY…… EVERYDAY……

Spanish flu killed millions

In the middle of 1917 a virulent flu epidemic broke out in Europe, and at a time of unrestricted travel between continents it spread worldwide. Spain was the first country to openly acknowledge the epidemic, and therefore inherited the name Spanish flu. The disease often resulted in pneumonia, and when a third wave hit in the spring of 1919, more than 25 million people succumbed. The disease killed more people than the war.

Entente Powers were helped when more soldiers had this type of camouflage helmet. In 1918 two million Americans landed in Europe.

> “The distraught general was forced to watch as 30,000 of his men surrendered”

cancelled the other planned offensives and began withdrawal. At the same time, the army leadership attempted to save supplies and ammunition from falling into the hands of Allies. But only three days after the battle at Marne, General Ludendorff had to pull the troops an additional 11 kilometres back on what he called a “black day” for the German Army.

The distraught general was forced to watch as 30,000 of his men surrendered to the enemy without much resistance as the Allies attacked.

The Second Battle of the Marne was the war’s turning point on the Western Front. The last fighting spirit had long since run out of the German soldiers, and no longer were there volunteers for continuing atrocities at the front. Over the previous four months, up to a million German soldiers who were sent off to the front never returned. More and more deserted.

But the horrors were not over. During the German withdrawal, Ludendorff’s troops killed at least 300,000 Allied soldiers. At the same time, 400,000 Germans were captured.

SOLDIERS BEGGED FOR MERCY

Until September, the US soldiers been under French leadership. But now General Pershing fulfilled his ambition to fight a battle as an independent American army. He chose to launch an attack against the German’s lesser position near the town of Saint-Mihiel, where they stood a good chance of victory.

Pershing put 550,000 US soldiers against the Germans with the goal of recapturing a railway line from Paris to Nancy, and was supported by 110,000 Frenchmen, heavy artillery, 400 French tanks and no less than 1,481 fighter aircraft – the largest number of aircraft ever in one single stroke. The attack surprised Ludendorff’s troops, and the Americans won the battle after two days. 8,000 German soldiers ended up as prisoners of war.

“Two of the younger German boys cried. My feelings changed quickly. At first I was afraid, so I was proud of myself because I stood here with 26 men who prayed for their lives”, remembered one US lieutenant.

50,000 American soldiers were killed in combat: just as many died of the flu.

GERMANY ASKED FOR CEASEFIRE

On 29th September – just over two weeks after the Battle of Saint-Mihiel – the German Kaiser Wilhelm II and the government received a recommendation from Ludendorff and Paul von Hindenburg, supreme commanders of the German army, to make peace with the Allies. At the same time the two army chiefs demanded a new German government, which would be based on a majority in the Reichstag. This wasn’t to laud democracy, but on the contrary was seen as a way to save the glory of the empire by making democratic forces responsible for the defeat.

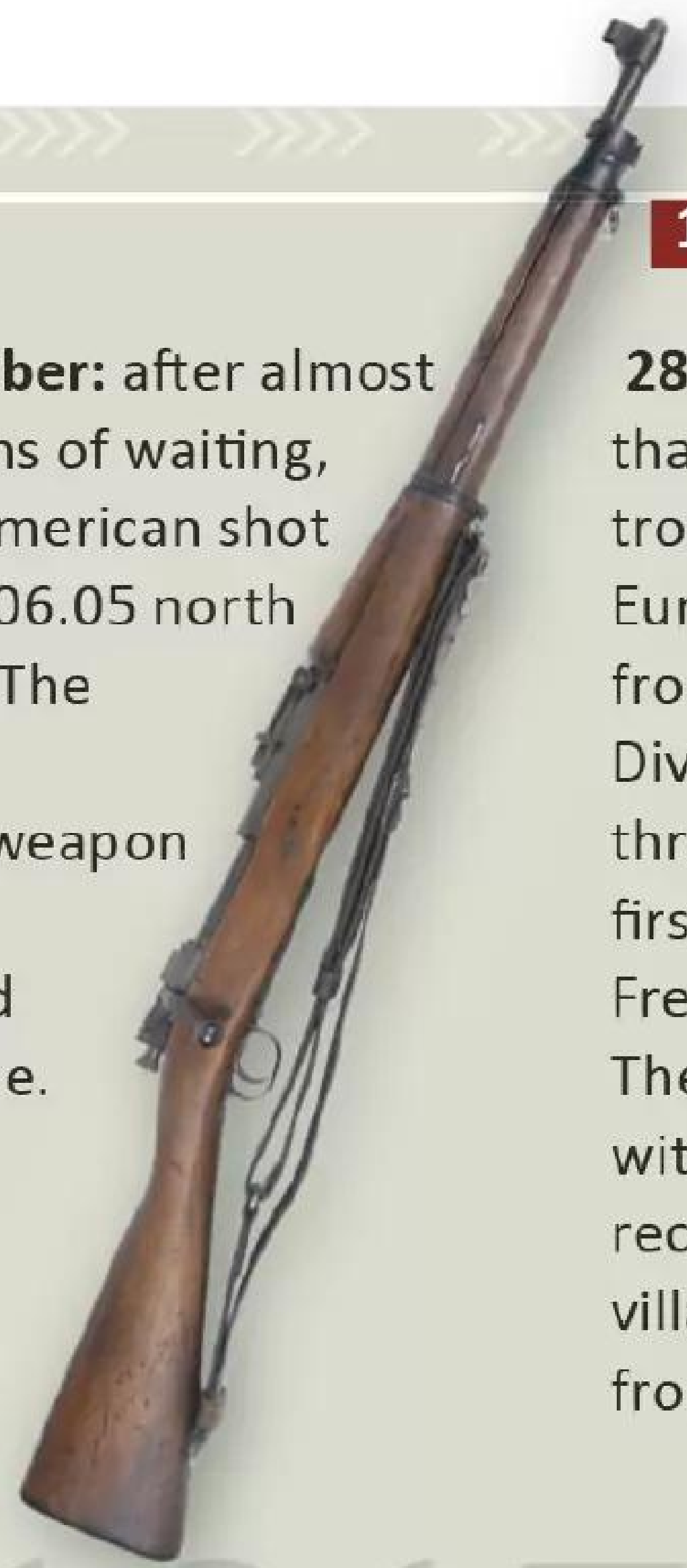
The army got its will. On 4th October, Germany sent a request for ceasefire negotiations to US President Woodrow Wilson. The President answered the German request with a number of demands for the Germans. If they had any hope of a truce, one of those demands was that both the Kaiser and army commanders resigned. When Ludendorff opposed the demands, he was fired. On 4th November, Wilhelm II renounced his throne, and a day later negotiations for an armistice could begin.

TOUGH PRICE DEMANDED FOR LOSS

The Germans hoped peace would be made on the 14 points Wilson had sketched out back in January 1918. Wilson’s programme ensured national self-determination, so while Germany would have to give up occupied Alsace-Lorraine to France as well as areas to Poland, it would retain most German territories. But the Allied supreme commander, France’s fierce General Foch, who led the ceasefire talks in the Compiègne forest, maintained a tougher stance. The Germans had to withdraw from the occupied territories of Western Europe within two weeks, and the Allies would occupy German territories from north to south all the way to the Rhine. Germany would also hand over large parts of its armaments, while the Allies’ blockade of German supplies would continue until the peace agreement was finalised. Although German negotiators

THE YANKS ARE COMING

American soldiers waited more than a year in military camps before they really went to war. The freshness of the forces on the battlefield led to victory after victory.



1917

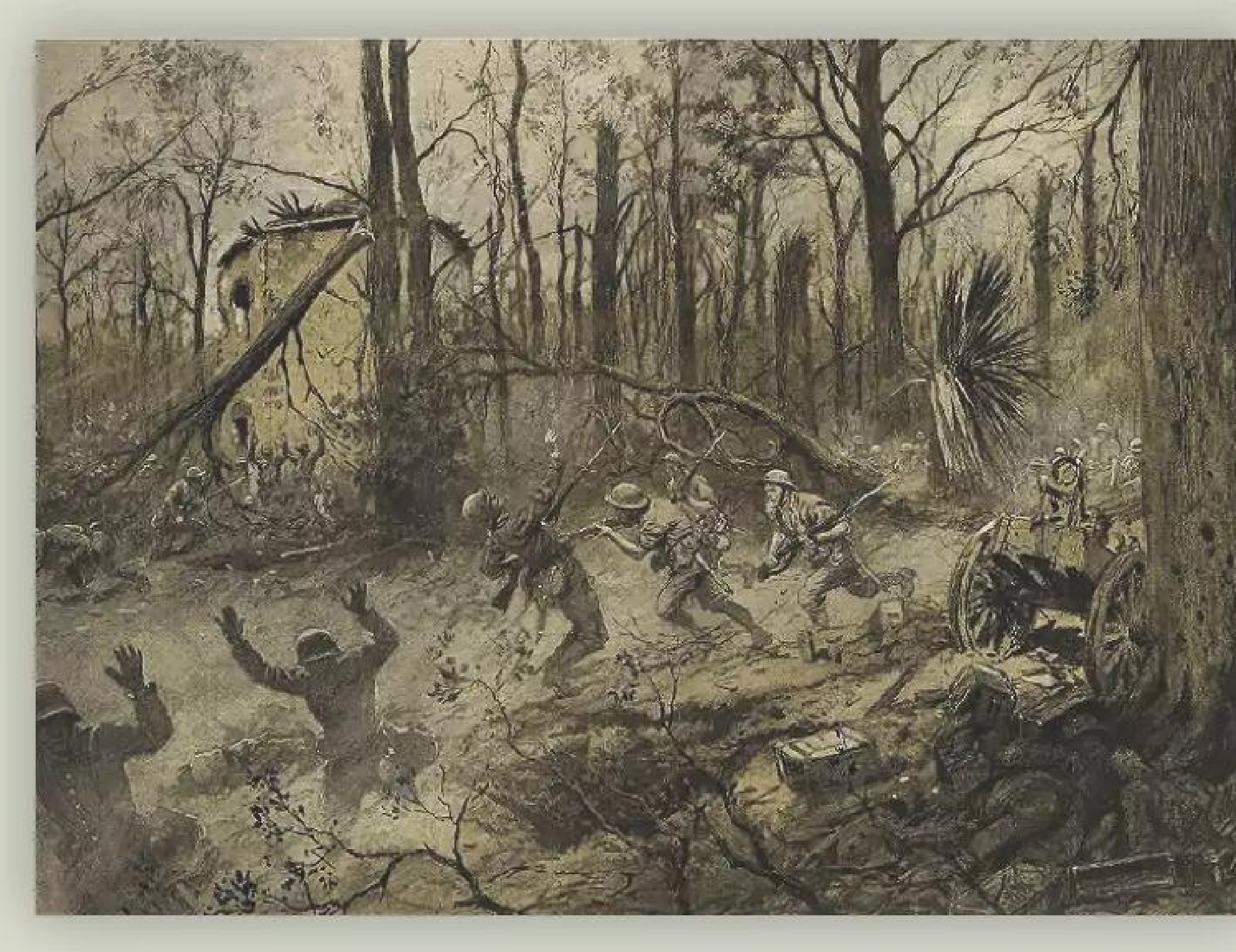
23rd October: after almost five months of waiting, the first American shot is fired at 06.05 north of **Nancy**. The American standard weapon was a Springfield M1903 rifle.

1918

28th May: more than a year after US troops arrived in Europe, soldiers from the US 1st Division are finally thrown into their first battle under French command. The battle ends with the Allies recapturing the village of **Cantigny** from the Germans.

1918

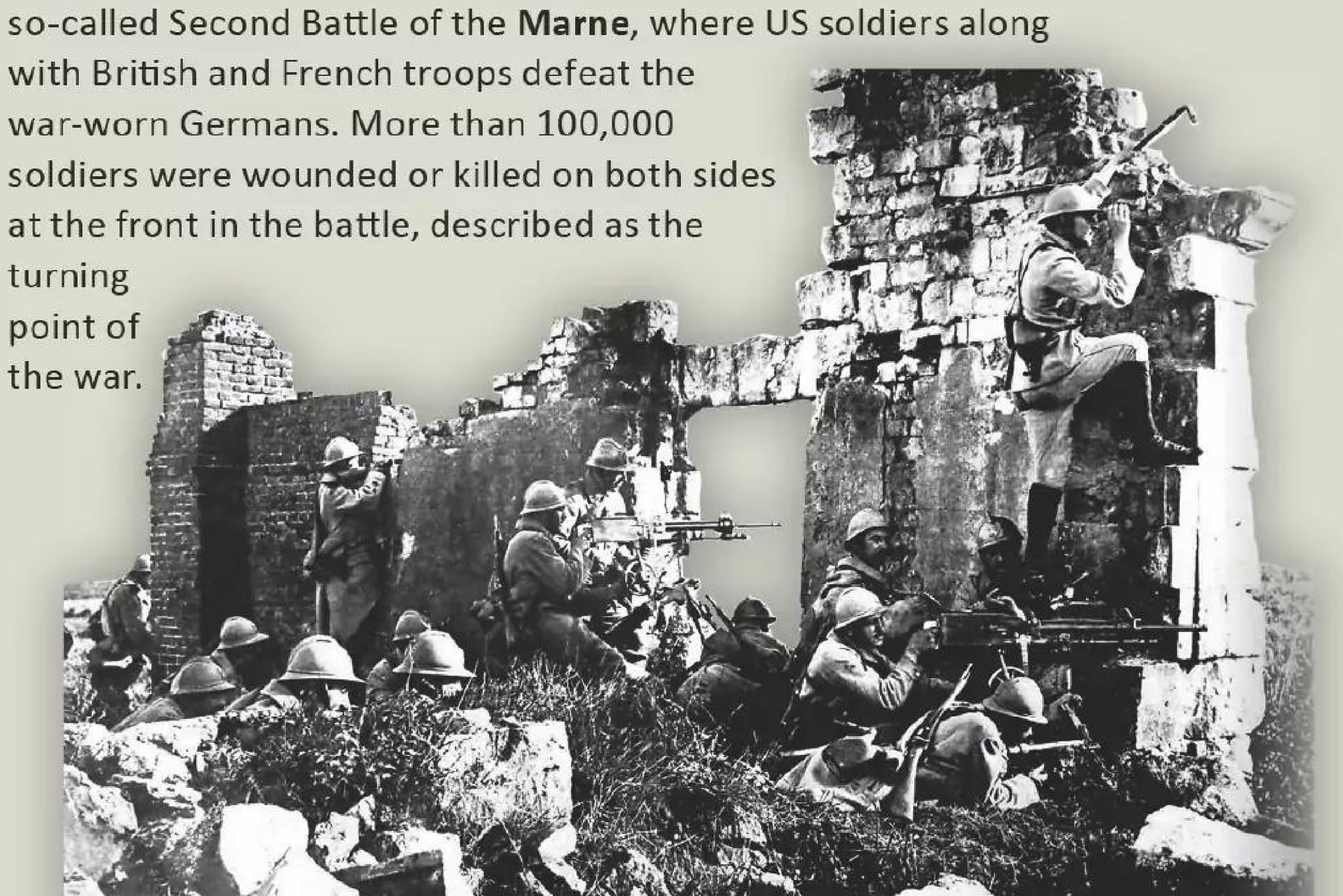
June: American marines fight under French command at **Belleau Wood** to halt the German advance – and win the battle. The French subsequently called the woods Bois de la Brigade de Marine (“Wood of the Marine Brigade”) in honour of the US soldiers.



The US 92nd and 93rd Divisions were reserved for African Americans.

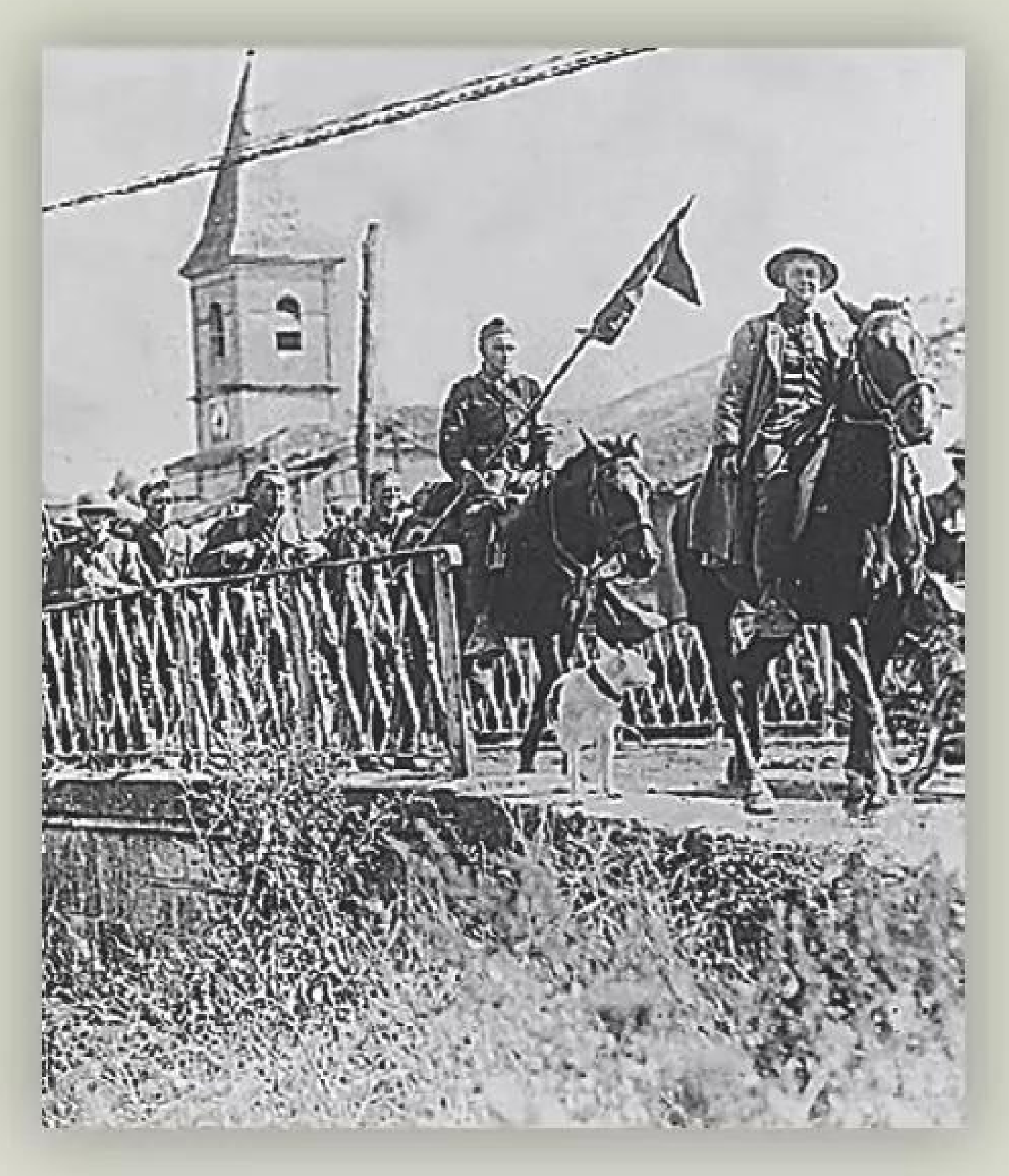
1918

July-August: the German's Spring Offensive culminates in the so-called Second Battle of the **Marne**, where US soldiers along with British and French troops defeat the war-worn Germans. More than 100,000 soldiers were wounded or killed on both sides at the front in the battle, described as the turning point of the war.



1918

12th September: for the first time in World War I, US soldiers fight as an independent army without French command. Within just 48 hours the Americans have taken the front section of the town of **Saint-Mihiel** and driven the Germans back.



1918

31st October: after a month of fighting, US soldiers manage to clear the French **Argonne Forest** of German soldiers. The battle ends as the war's bloodiest for US troops – in all, 122,000 men were killed or wounded.

1918

EUROPE'S NEW BORDERS

Peace agreements after World War I added 20,000 kilometres of new borders to European maps. The ambition was that these borders should reflect Europe's different nationalities, but in practice they were drawn to meet the interests of the victors. The agreements created new ethnic minorities and planted the seeds of future conflicts.

The US president meets with the Prime Ministers of Britain and France at Versailles palace, where the peace agreement was signed.

>>>> objected to the forceful demands, they had no choice. Two million American soldiers stood ready for battle, while exhausted German soldiers on the other side of the front protested and committed mutiny. They were starving, and morale was at an all-time low.

The withdrawal and bloody fighting in the field continued while the parties negotiated. On the morning of 11th November, at least 2,700 soldiers lost their lives before Germany accepted the ceasefire agreement.

THE BATTLEFIELD WAS SILENT

Word of the ceasefire triggered euphoric jubilation among Allied soldiers at the Western Front. They threw their helmets in the air while cries of "The war is over… the war is over… an armistice has been signed" echoed around the war-torn battlefield.

The news had not reached all units when to their great amazement they saw local French residents running delightedly in the streets, shouting: "Vive La France! Vive L'America!"

The German surrender led to silence on their side of the front.

"After months of constant roar of guns and exploding shells, to have everything stop all at once, the quietness was too much for us; we couldn't believe it was true and we were lost without the noise. I couldn't get my mind to believe the war was ended", said Private John A Hughes.

Celebrations also broke out among German soldiers who in several places came running directly towards men who – just hours previously – would have been their enemies and shot them without blinking. According to American Carl Stuber, the defeated Germans were the most ecstatic on the battlefield. Hungry for food and cigarettes they jumped into the Allied trenches.

"We were stunned… They said their food had been vile. We had some burned rice that our boys wouldn't eat and they fell on it like wolves", Stuber recalled.

Elsewhere, reality had not yet dawned on some German soldiers. The truce was signed while they still had control of French and Belgian soil, and the soldiers felt their leaders had stabbed them in the back.

VICTORS DICTATED PEACE

Just over two months after the ceasefire, the victors – led by British, French and US leaders David Lloyd George, Georges Clemenceau and Woodrow Wilson – met in Paris to negotiate the terms for peace. During the war, several had advocated an agreement built on freedom, democracy and the right to national self-determination. But now that the victory was assured the mood had changed and people demanded severe punishment for the Germans. The negotiations were marked as much by a desire for retribution as they were to make peace.

> "This is not peace. It is an armistice for twenty years", was French general Foch's gloomy prediction.

The negotiators at the Paris Conference began by drawing lines on a European map that looked completely different from the start of the war. The goal was to create a Europe whose borders followed the nationality of its inhabitants, which proved to be an impossible task, as the territories in many places were a mishmash of different ethnic groups. The former superpower Austria-Hungary had collapsed and must now provide areas for the newly created countries of Czechoslovakia and Yugoslavia. Both Italy and Greece required a part of the Ottoman Empire, while nationalist Polish leaders drew up a highly optimistic draft for the restoration of Poland, which would both encompass Polish nationals and have access to the sea. The division of Europe was no less complicated by the fact that several regions were now trying to get rid of Russia, who had fought on the victorious side.

In an effort to avoid future wars the victors created the League of Nations to prevent and resolve future international conflicts peacefully. Only the victors and neutral powers were invited to be members, and the US Senate said no to American membership. In practice, the peace process underwent six months of negotiations between the victors, before finally being presented to the losers who had no opportunity to object. The Allies divided up the peace talks and negotiated separate agreements with each of the losing nations. The most important of these was the Treaty of Versailles – the peace agreement between the Allies and Germany, which after the collapse of both Austria-Hungary and the Ottoman Empire, was the only major power remaining on the losing side. The treaty dictated – among other things – that Germany had to give up 13 percent of its European territory to France, Poland and Denmark, while its colonies in the Pacific, China and Africa were divided among the victors. It also forbade Germany to have more than 100,000 soldiers, the empire also had to shut down its air force, plus destroy its tanks, stocks of poison gas and all military facilities west of the Rhine.

The most damning point of the Peace agreement was Article 231, which laid full responsibility for the losses and damages during the war on the Central Powers. The article made it possible for the victors to demand a huge war injury claim.

132 BILLION GOLD MARKS REQUIRED

The French set out to claim its entire war costs – both material losses and war pensions for the soldiers. Although the other Allied powers thought the claims were excessive, the resulting amount was a staggering 132 billion gold marks. According to British economist John Maynard Keynes, who strongly opposed the format of the Treaty of Versailles, it would take the Germans until 1988 to pay back the debt.

German negotiators were shocked by the draft and tried to reduce it, but without success. The government had no choice but to sign the treaty in the Hall of Mirrors at the Palace of Versailles on 28th July, 1919. The seeds of Germany's economic collapse were laid, and the Treaty's harsh demands were identified by Keynes – financial representative for the Treasury at the peace conference – as a "Carthaginian peace". Even the French general Ferdinand Foch thought the peace agreement too harsh.

"This is not peace. It is an armistice for twenty years", was the prophetic general's gloomy – but accurate – prediction. ■

NEW COUNTRY
CZECHOSLOVAKIA

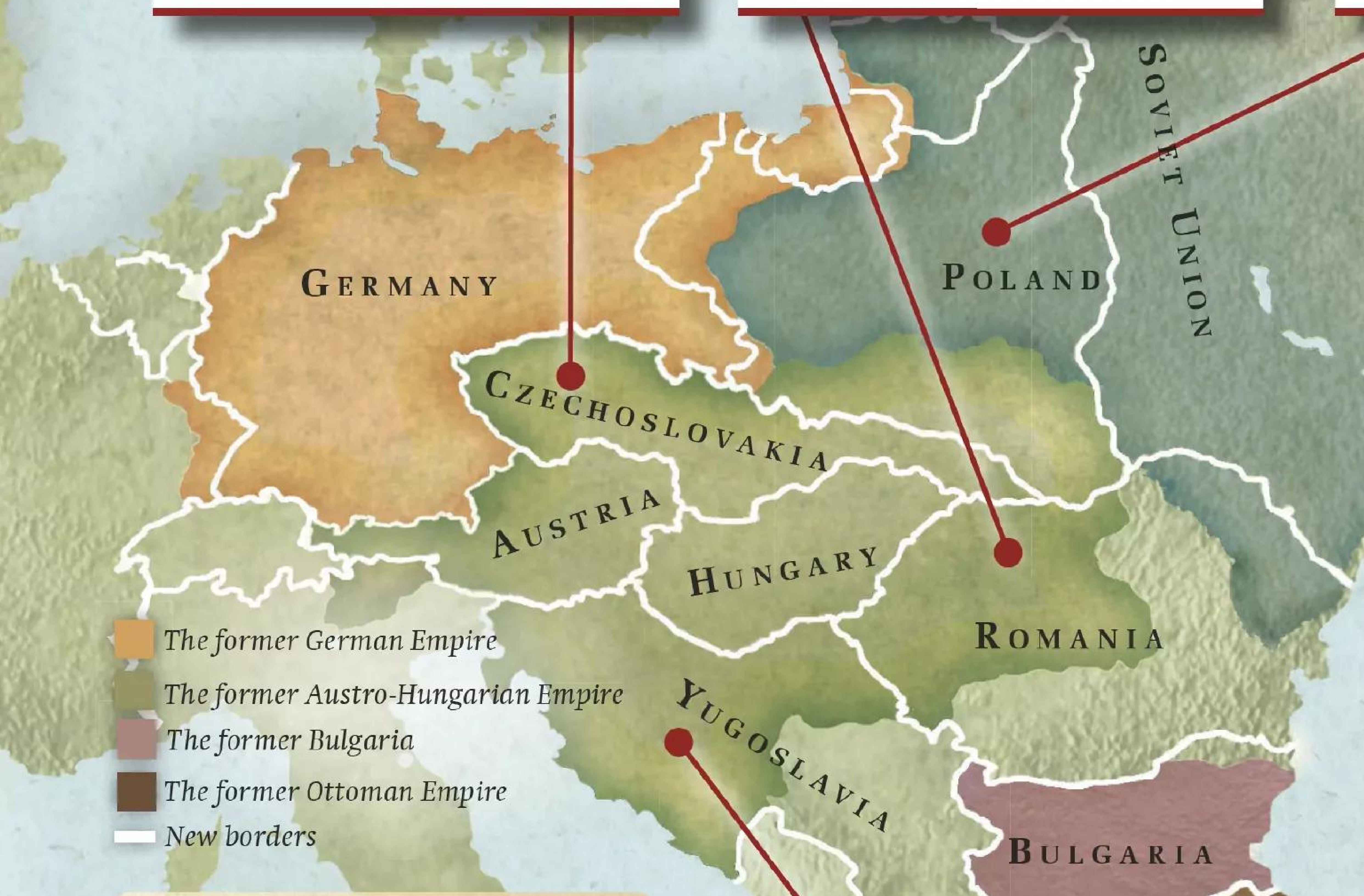
■ **Population (1921): 13.6 million**
■ **Area: 140,446 km²**
■ *Until 1918 Czechs and Slovaks had been part of the Austro-Hungarian Empire. The peace agreement secured them their own country. But the design of Czechoslovakia in no way followed national borders. The new borders left a large German minority – 22 percent of the population – in the Sudetenland on the border with Germany.*

EXPANDED
ROMANIA

■ **Population (1919): 14.7 million**
■ **Area: 295,049 km²**
■ *Romania grew to twice its size after peace talks when the country was awarded the former Austro-Hungarian Transylvania. The new area housed both German and Hungarian minorities. These groups were excluded from politics, and Romanian leaders demanded that government employees only spoke Romanian.*

NEW COUNTRY
POLAND

■ **Population (1921): 27 million**
■ **Area: 387,000 km²**
■ *During the war, the Allies had already decided to restore a Polish republic and so Poland gained its independence from the ceasefire in November 1918. The need for access to the Baltic Sea in the new Poland left the country with a large German minority – a strike against the principles of the right to national self-determination.*



VICTORS

SOVIET UNION

■ **Leader: Vladimir Lenin (from 1922)**
■ *After World War I ended, Russia was plagued by civil war between the Bolsheviks and conservatives. Several areas declared themselves independent. Although the Russians were on the victorious' side, they were forced to cede territory to Poland, Lithuania, Latvia, Estonia and Finland.*

GREAT BRITAIN

■ **Prime Minister: David Lloyd George**
■ *Great Britain took over German and Ottoman territories in the Middle East and Africa after the war and ruled as the most powerful empire in the world. Economic problems and growing unrest in the colonies made it difficult for Britain to hold its global empire together.*

FRANCE

■ **Prime Minister: Georges Clemenceau**
■ *The Treaty of Versailles restored the German-occupied territories of Alsace-Lorraine to France and it also gained part of the Middle East that's modern-day Lebanon and Syria. For France, it was also important that the peace agreement disarmed the German Army.*

ITALY

■ **Prime Minister:**
Vittorio Emanuele Orlando
■ *The peace treaty left the Italians bitter. In return for their support to the Allies they'd been promised Dalmatia on the Adriatic, but only received the areas around Trieste and Trento. Unrest broke out, inspired by the Russian Revolution.*

LOSERS

GERMANY

■ **President: Friedrich Ebert**
■ **Reshaped Weimar Republic**
■ *Forced to shoulder the blame for "all loss and damage", Germany was the war's biggest loser. The Germans had to pay 132 billion gold marks in damages (the value of about 48,000 tonnes of gold), disarm their military and deliver 13 percent of their territory to France, Poland, Denmark and Lithuania. The Treaty of Versailles left the Germans impoverished and embittered.*

AUSTRIA-HUNGARY

■ **Presidents:**
Karl Seitz and Mihály Károlyi
■ **Shared in Austria and Hungary**
■ *The dual monarchy collapsed and had to cede territory to new countries Czechoslovakia and Yugoslavia as well as areas for Poland and Romania. The German- speaking areas of Austria voted in favour of becoming part of Germany, but it was vetoed by the Allies.*

BULGARIA

■ **Tsar: Boris III**
■ **Continuing Bulgaria**
■ *Bulgaria had to concede territory to Greece and pay huge war reparations. Tsar Boris III ruled the ruined country as dictator until World War II.*

THE OTTOMAN EMPIRE

■ **Sultan: Mehmed VI**
■ **Lasted until 1922**
■ *The Empire – over 600 years old – passed partially to French and British control. In 1922, Turkish troops expelled the British and formed an independent Turkey.*

NEW COUNTRY
YUGOSLAVIA

■ **Population: 12 million**
■ **Area: 247,542 km²**
■ *Slavic Serbs succeeded in convincing the victors to create a common Slavic state called the Kingdom of Slovenes, Croats and Serbs, which became Yugoslavia in 1929. The state was a mix of ethnic and religious minorities.*

German soldiers marched to prison camps after the defeat at Saint-Mihiel in September 1918.

TRACES LEFT BEHIND

1919-2003

A few metres underground witnesses saw well-preserved trenches with millions of tonnes of unexploded grenades and the crushed bodies of fallen soldiers from the horrors of World War I. Immediately after the war veterans, relatives and the curious flocked to the old fronts in the hope of finding traces of the fighting and the fallen, and in the 20th century's last decades professional archaeologists assiduously embarked upon the battlefields. Armed with excavators, brushes and modern technology they have made fascinating finds.

1919-2003

1919: the curious and relatives begin to delve in the battlefields.

1991: archaeologists find French writer Alain-Fournier's body in a mass grave.

1998: an intact tank pops out of the ground near the French city of Cambrai.

2001: archaeologists find a workshop where German POWs mass-produced trench art.

2003: British archaeologists identify the body of German soldier Jacob Hönes.

1919 1991 1998 2001 2003

In 2008 archaeologist Steve Litherland identified the body of Australian soldier Alan James Mather using DNA analysis.

When a group of British archaeologists and historians arrived at Serre in northern France in October 2003, they quickly made an interesting discovery. Close to what was once the strategically important German position of Heidenkopf, archaeologists found the bodies of two German soldiers from World War I. One of the bodies aroused the archaeologists' curiosity in particular. On the body of the soldier they found two full ammunition pouches, a bread bag, a mirror, a comb and the remains of a torch, which was an absolute necessity for navigating the trenches in the dark. In the soldier's trouser pocket was a can of wax polish for his boots.

Most exciting, however, was the soldier's identification tag. Usually there was no personal information on German soldiers' tags, for fear of them falling into enemy hands. But this German soldier had broken the rules and scratched his name on the back of his. The letters were almost illegible, but archaeologists managed to decipher the name: Jacob Hönes. The soldier had also engraved the name of his home town, Münchingen near Stuttgart.

He left a pregnant wife at home

Researchers could now identify the house where the soldier Hönes had lived, they could find a picture of him, and they could find out what kind of life he had lived. Hönes went from being an anonymous skeleton to an actual person.

With the information from the identification tag the research team concluded that Hönes was the middle son in a working-class family. He had never experienced anything like teenage years, but had gone directly from primary school into work. There he was, until around the age of 33 years old, when he was sent to the Western Front, specifically the trenches of the Somme. When Hönes travelled by train from the station in Stuttgart, he was leaving seven children and his pregnant wife Mary behind.

In connection with the investigation, researchers found a letter dated April 1915 from Jacob to Mary. The letter was a good example of what the soldiers cared about. Not politics, but about whether Mary had received the money he had sent home. He also wrote that he believed the war would soon end.

Urban developers threaten to cover the archaeological remains from WWI with asphalt and concrete before they are found.

Unfortunately, it was only for Hönes that the war drew to a close. German military records show that on the evening before his death in June 1915, Hönes was ordered to put barbed wire up around the trenches to strengthen the defences at Heidenkopf – an extremely risky job where the slightest sound or the smallest flash of light could mean death by an enemy sniper's bullet.

How Hönes died exactly, no one will probably ever know. But the following day his luck ran out.

Veteran chased war goods

Archaeological research around World War I is a relatively new discipline, and the battlefields archaeologists examine are considered special subjects, since they act as tombs for missing soldiers, tourist destinations and places of remembrance. In addition, certain areas are still highly lethal where the ground is full of unexploded bombs and shells.

The first to comb through the former battlefields for remnants of war were the soldiers who, once peace had been declared, returned home to poverty and unemployment in their devastated villages. The veterans were forced to find alternative ways to survive, and a widespread strategy was to search the battlefields for military debris that could be sold to the authorities or as souvenirs for the increasing number of tourists who had already began to arrive from 1919.

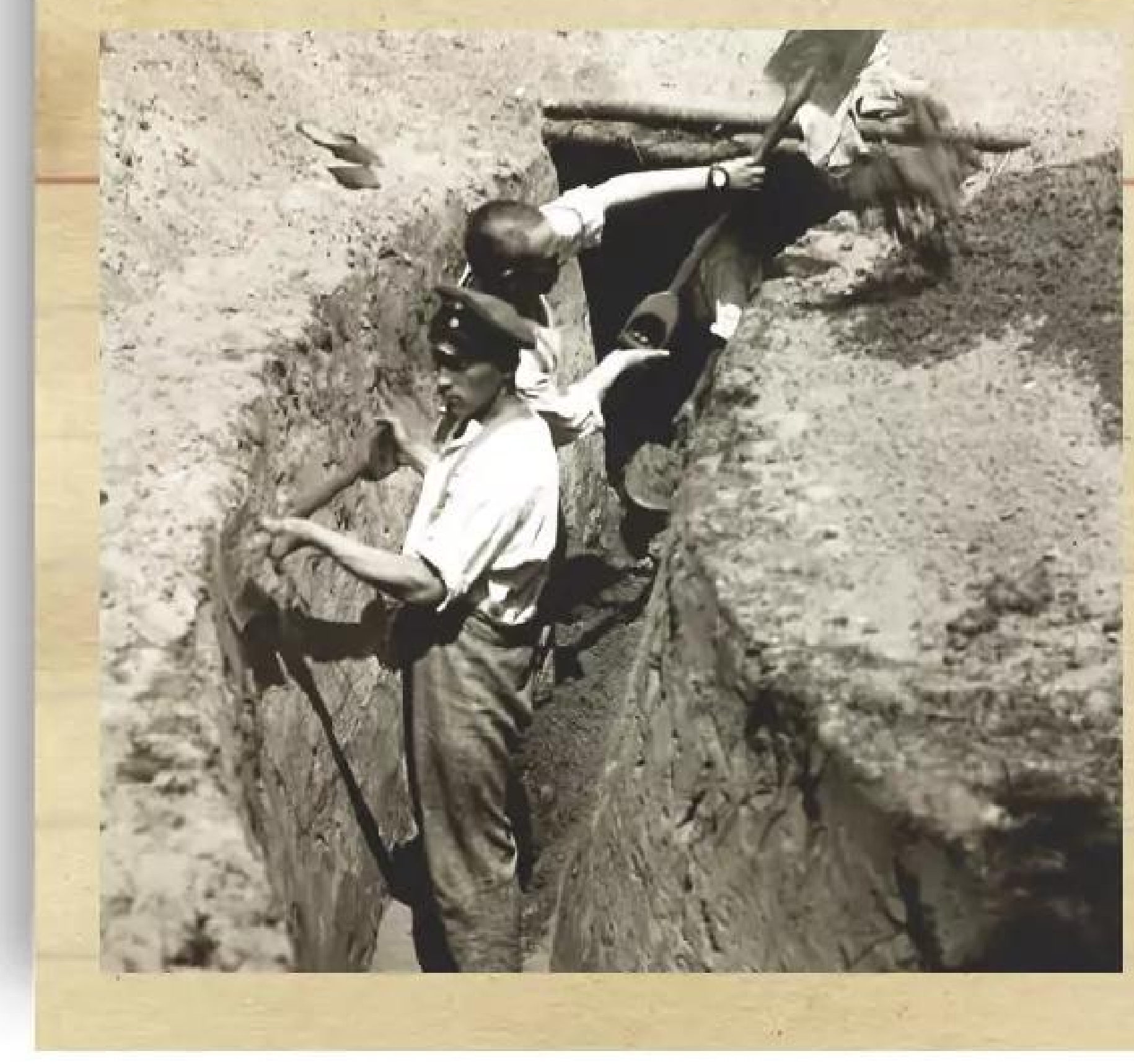
Soldiers and others' search for war booty continued throughout the 1920s and 1930s, but it was still too early for professional archaeologists to start – from their perspective the bodies from World War I were barely cold.

It wasn't until the end of the 20th and early 21st centuries that archaeological research into World War I really took off. Archaeologists and historians began to become aware of what makes the former battlefields archaeologically unique and interesting: entire trench systems remain intact, weapons and personal belongings are often well-preserved, and are buried quite close to the ground's surface.

So far results have been promising. Archaeologists have identified clear differences between German and British trench structures – generally the Germans' are much more robust – just as they have a multitude of small archaeological finds, such as ammunition, tools and equipment. Archaeologists have also learned more about soldiers' daily lives like their eating and drinking habits.

Finally, it has great value every time they manage to identify a body, so it can be brought back home where it belongs – as a thank you for that person who paid the highest price. For example, in the wake of the archaeologists' identification of the body of German soldier Jacob Hönes, he

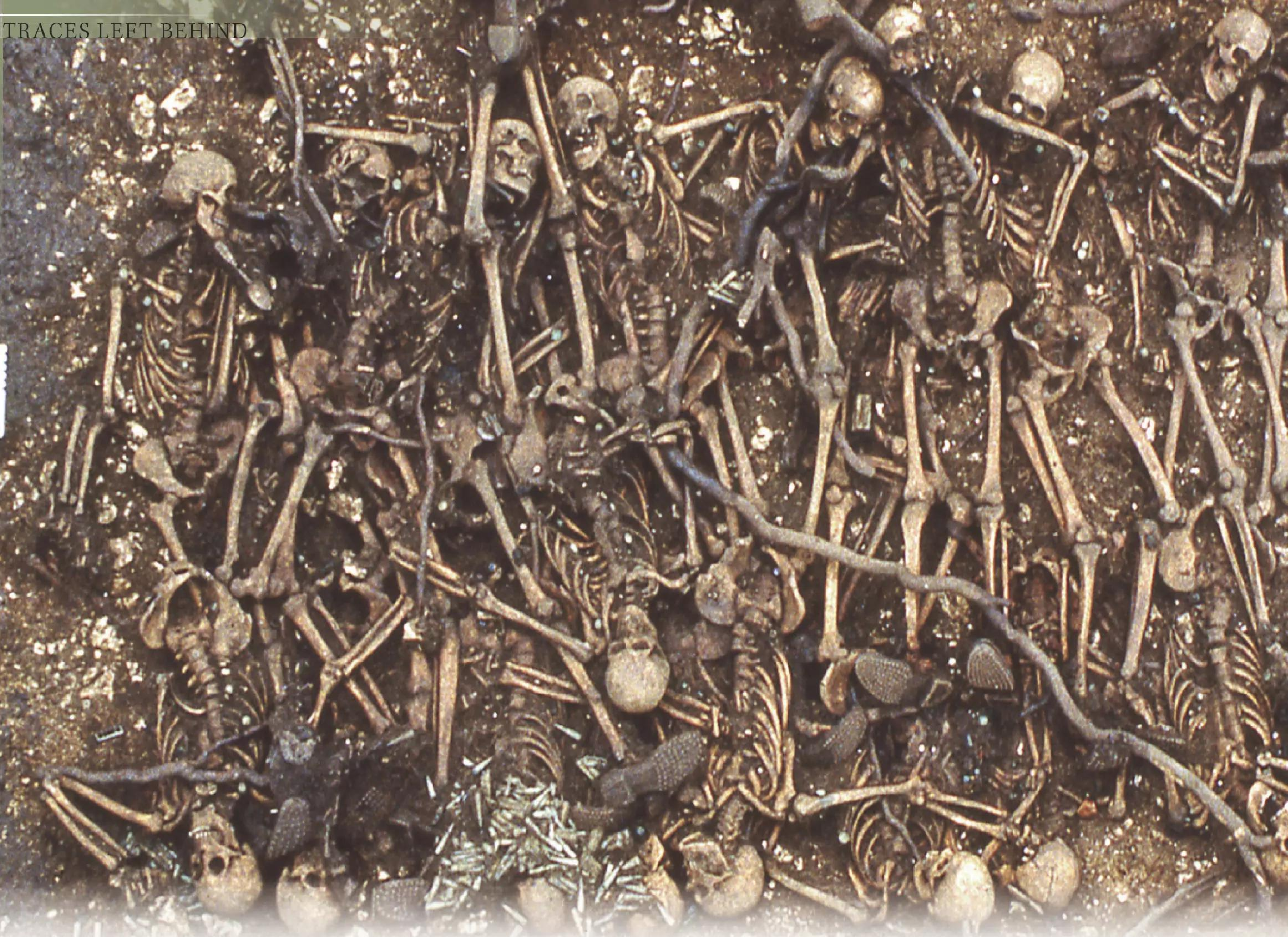
TECHNOLOGY CULTURE ECONOMY EVERYDAY



Soldiers did archaeology

Work to reveal World War I's many trenches has become, in a way, the longest archaeological dig in world history. There was possibly more soil excavated and several prehistoric objects discovered during the war's four years than at any time before or since. Soldiers found flint axes, weapons and jewellery from the Bronze Age, as well as ancient tombs and ancient fortifications. Both the British and French created special archaeological services during the war.

This well-preserved corpse of a British soldier unearthed in 2001 generated lots of attention when it was found at Boesinghe near Ypres in Belgium.



was finally buried in a German military cemetery near Metz, more than 90 years after his death on northern French soil.

Author lay in the mass grave

The most horrifying discoveries archaeologists have found are the mass graves, which sprang up around the Somme in France. One of the earliest excavations uncovered the bodies of 21 French soldiers at Saint-Remy-la-Calonne in north-eastern France in 1991.

In the mass grave were the bones of the famous French writer Alain-Fournier. His real name was Henri Alban-Fournier, and he only wrote a single novel, *Le Grand Meaulnes* (My Great Friend) – but it is certainly classic French literature.

Lieutenant Fournier belonged to a group of soldiers from the 288th Infantry Regiment, which had disappeared after last being seen entering Saint-Remy-woods on 22nd September, 1914. The group's disappearance started a myth that men had not been killed in battle, but had been executed by the Germans.

The story fitted well into the picture of German war crimes, which was also painted by other reports at the beginning of the war. At the same time the rumour and Alain-Fournier's hero status reinforced the mystery surrounding the young author's death after the war. When archaeologists began to look for the truth behind Alain-Fournier's story in 1991, they went ahead without much public interest. But when a Parisian newspaper mentioned excavations, everything transformed into a media circus that both journalists and ordinary citizens soon flocked to. Alain-Fournier's status and the mystery surrounding his disappearance piqued people's curiosity, and the hope of finding war writings from his hand created a media event and a hubbub that required armed guards.

TECHNOLOGY CULTURE ECONOMY EVERYDAY

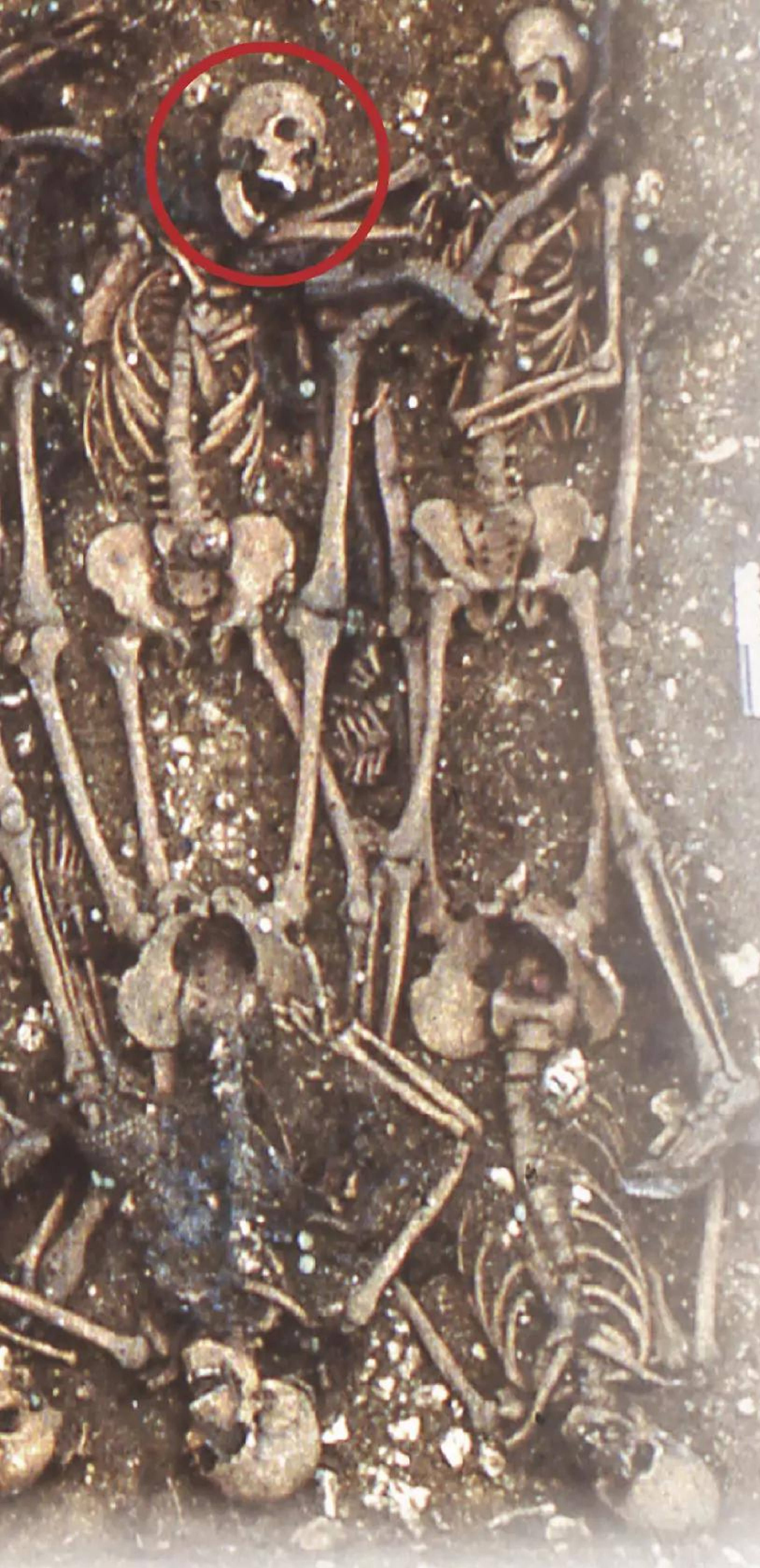
Battlefields were tourist attractions

From 1919 the curious and fallen soldiers' relatives flowed to the Western Front's battlefields where in the years following World War I they searched for traces of the war and their relatives. The BBC series "The Great War" in 1964 created a renewed interest in WWI and in the early 1970s, 50,000 people travelled annually to the Western Front. By 1974, visitor numbers were up to 250,000. The number of tourists has subsequently increased annually.

Privates were under sized

The excavations proved that soldiers had been buried in proper military style: head to toe with the captain at one end and then by decreasing rank to the ordinary soldiers at the other. Archaeologists also found several of the soldiers' belongings such as cartridges, water bottles (each with bullet holes), dental braces, religious medallions, belt buckles, boots and 16 identification tags.

Archaeologists began to compare the soldiers' information with the official French lists of soldiers who were reported missing in the area. At the same time they rigorously investigated the corpses' physical characteristics and the remnants that still hung on the skeletons, and finally, they concluded that the men had undoubtedly belonged to the 288th regiment.



French writer Alain-Fournier (in the red ring) was unearthed in 1991 during an excavation that after 77 years finally revealed the truth about his mythical death.

> “A metal detector unearthed a large object underground”

In total, researchers identified 19 out of 21 – among them Alain-Fournier. A thorough study of soldiers' wounds also gave a fairly accurate description of how they had died. Rumours of systematic mass extermination had long existed among the French, but the investigation revealed the soldiers' wounds had an arbitrary character fitting in with injuries one would expect from a soldier who died in battle. The researchers estimated that the 21 soldiers had most likely been surrounded by Germans and shot at from all sides. Then they were probably buried by the Germans, who had apparently requisitioned the dead Frenchmen's caps as souvenirs – not a single cap lay in the grave.

This way the archaeological surveys destroyed the myth about a German war crime committed against one of France's famous writers and his fellow soldiers – a myth that had flourished for more than three quarters of a century.

Researchers' detailed studies of the bodies in the mass grave also threw up other interesting observations. For example, the average height of the ordinary soldiers who were primarily recruited from among peasants and artisans was 1.60 metres. Of the three officers the average height was, by contrast, 1.78 metres. The difference gave an insight into the social and economic divide between the classes in contemporary France – and clearly its nutritional consequences.

50-75,000
tonnes of explosives were collected by experts annually from France's old battlefields.

Monster hid one metre below

One of the most famous archaeological finds after World War I was unquestionably found in the small village of Flesquières near the northern French city of Cambrai: here in 1998 researchers found a completely intact example of one of the huge mechanical monsters that took to the battlefields at the end of the war – a tank.

The main impetus for the investigations that led to the discovery was local historian Philippe Gorczynski, who was part of an effort to establish a museum filled with artefacts from both world wars. Gorczynski possessed a thorough knowledge of the area around Cambrai and a special interest in British tanks.

Gorczynski had heard local rumours that there might be a tank buried somewhere in the area. A metal detector unearthed a large object under the ground at a place identified by a local woman, and in November 1998, excavation started. Just one metre underground the roof hatch of a British Mark IV tank was revealed. Here, the huge steel colossus, which was about eight metres long, four metres wide and 2.5 metres high, had been buried since the war.

The tank was damaged on its right side, but the left side was still in excellent condition with its tracks, Daimler engine and exhaust intact. Gorczynski and the team noticed that the tank had been dragged down into a hole and all the material that they found inside the tank was of German origin. Also the tank's British machine guns had been replaced by German ones.

One theory is that the Germans put the tank out of action during the Battle of Cambrai, and that they had then reused it as a reinforced German defence position. Through research into military archives and using a photo of a tank with identical damage, Gorczynski managed to identify the tank as D51, nicknamed Deborah, from the British Tank Corps D Company.

Prisoners of war produced art

Around 40 kilometres north-west of where Deborah was found – at Le Point du Jour a

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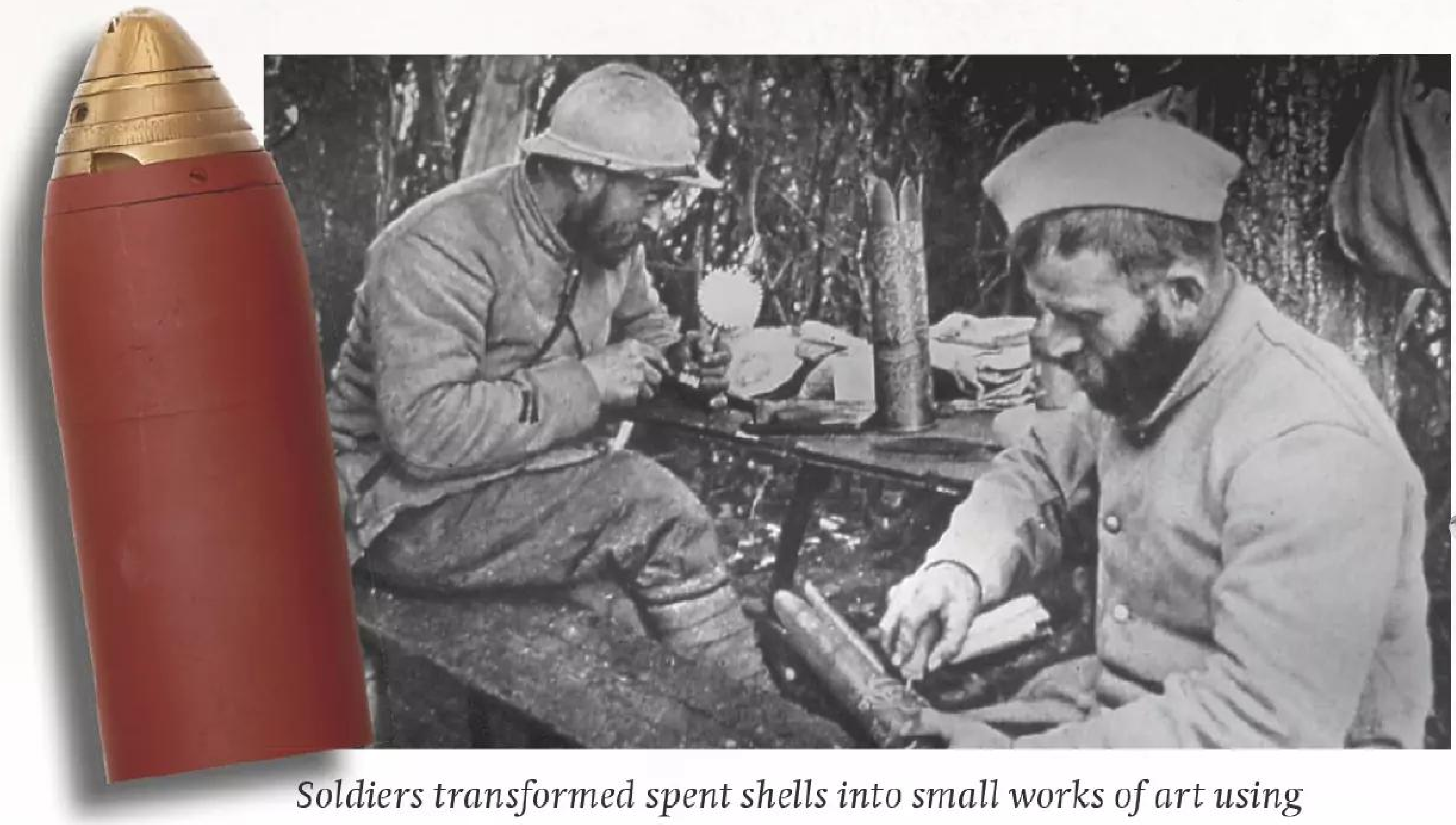
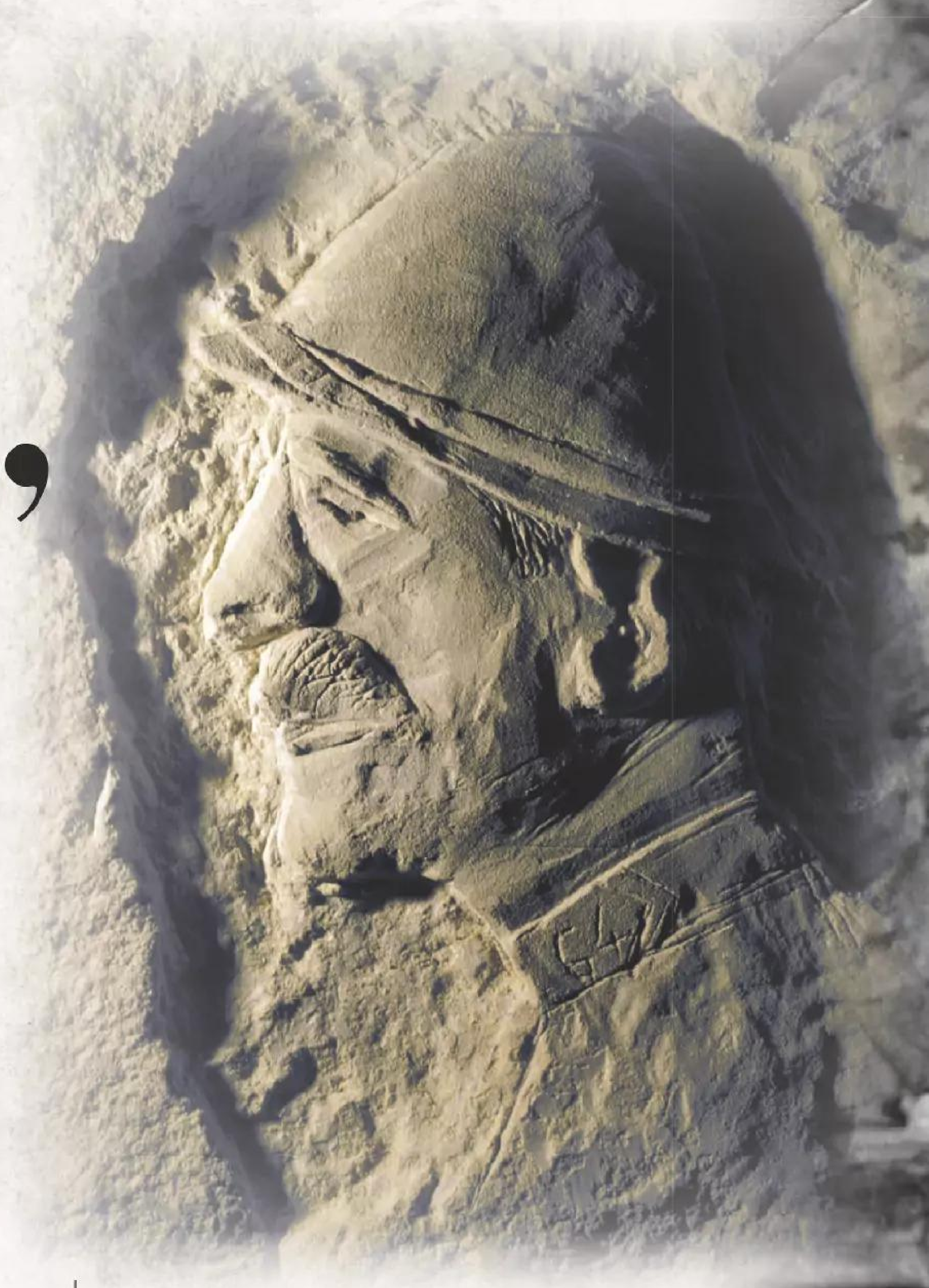


Soldiers transformed spent shells into small works of art using simple tools.

Helmets, weapons and other items were unearthed in 2011 from a well-preserved German trench in Carspach Alsace.

> “Some of the caves were several hundred metres long and 15 metres high”



Hundreds of kilometres of tunnels run along the northern French ridge of Chemin des Dames where soldiers had left their mark.

little north-east of Arras – a team of French archaeologists were in the process of investigating a 63-hectare area in 2001, upon which a factory was to be built.

In total the archaeologists exposed a 120-kilometre trench, and among the finds were relics from both the Bronze and Iron Ages as well as a small Roman fort from the time of Augustus. But there were also abundant finds from World War I, including the bodies of 31 British soldiers before they encountered some quite unexpected finds that they'd been completely unprepared for

During the war, many soldiers on both sides of the front spent a considerable amount of time and energy making small decorative objects from war waste – so-called trench art. By Arras graves archaeologists not only found a pure treasure trove of trench art – down in the French soil they discovered the initial remains of a dedicated workshop or “atelier” of trench art. Quickly it transpired that there was also a workshop from the time just after the war. The workshop had been used by German prisoners of war who had worked repairing the railroad from Arras to Lens in 1919. Some of the objects had the creator's name engraved, others had words like Weltkrieg (World War) or POW (prisoner of war) scratched into them, and the list of objects included letter openers, belt buckles, inkwells and matchbox holders. The works of art that were unique and creative were made from materials like empty canisters, brass and aluminium scraps.

Soldiers lived in caves

One aspect of archaeology following World War I that researchers have only just started to address is the exploration of the underground caves, carved into the limestone landscape in northern France. This is particularly true of Arras, where there are a multitude of caves created in the 16th and 17th century during the excavation of limestone for building material. Some of the caves are several hundred metres long and up to 15 metres high with giant limestone pillars to prevent the caves collapsing. During the war the Allies linked the caves with tunnels and installed electric lights, telephone cables, a water supply and even a narrow railway line, and they built toilets, kitchens and makeshift medical facilities. The whole system stretched over 22 kilometres.

> “Everywhere on the porous walls, soldiers had carved or painted images”.

The caves served as shelters during WWII, but then slowly disappeared from people's minds. The growth of battlefield tourism in the 1960s meant there was an increased interest in the vast underground system, and from the 1990s Arras' city archaeologists began to explore the caves. Down in the depths of the caves, researchers found a multitude of everyday things from the soldiers' lives: rusty cookware, water bottles and cutlery among military remnants, telephone cables and electrical installations, delivering a insight into the soldiers' lives. But the caves revealed more than that. The sight was spectacular. Everywhere on the porous walls, soldiers had carved or painted images, and archaeologists found everything from portraits of Joan of Arc wrapped in the French flag over the American eagle to landscape representations and Native American images. In many places the walls were also marked by inscriptions with soldiers' names. Historians have interpreted the many names as an expression of the soldiers' need to leave their mark – maybe before embarking on a battle they had no idea whether they'd survive and by leaving their mark they created a legacy, something by which they would be remembered.

The inscriptions in the caves are thus a curious inverted version of the war cemetery's official memorials, where the bodies are underneath, while the names stand above. In the caves of Arras and elsewhere the names are underground, while the bodies are hiding – ready to be found by archaeologists.■

HARRY PATCH *1898-2009*

TRENCHES' LAST SURVIVOR

■ The last living memories of life in the trenches disappeared with 111-year-old Harry Patch's death in 2009. The old Briton had as a young man trained to be a plumber with no desire to sign up when war broke out. But when conscription was introduced, Patch was drafted and sent to the front where on 22nd September, 1917 his groin was pierced by shrapnel, but luckily he survived. Like so many other veterans Patch didn't talk about the war once it was over, and it wasn't until 80 years later, that he broke his silence with his memoirs. All his life Patch was opposed to war, he didn't want to fight at all and in his memoirs he wrote, “I had no inclination to fight anybody. I wasn't at all patriotic. I went and did what was asked of me and no more”.

Fought in the Battle of Passchendaele in 1917 – Opposed to war – Was one of Europe's oldest men

25,000 British and Allied soldiers hid in limestone caves in Arras in 1917, ready to launch a surprise attack on the Germans above.

COVER
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DEATH IN THE TRENCHES

Editor-in-chief: Ann Qvist
Publishing Director: Elisabeth Halmø
Cover: Sara Hougaard Bagge
Production: Eva L Strandmose

Bringing History to Life is published by:
© Bonnier Publications International AS,
PB 543, 1411 Kolbotn, Norway.

Marketing/Distribution UK:
Marketforce (UK),
121-141 Westbourne Terrace,
London W2 6QA
0330 390 6464 | Hello@Marketforce.co.uk

Printed by: Poligrafijas Grupa Mukusala, Latvia

ISSN: 2445-6659

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Tel: +44 (0)7753 811622

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Doctors at the front carried only the most essential equipment so that they could easily move around in the trenches and away from incursions. Many operations, including amputation, took place without anaesthesia and in non-sterile surroundings. Despite this, many wounded survived. The doctors were quick to stop blood loss.

War veterans died young

WAR IN A TIN CAN

1915-1918

On an early autumn morning in 1916, 32 steel boxes bumped forward over the northern French battlefield to the great horror of the German soldiers who had never seen anything like it before. It was at least as daunting an experience for the tank crews too. They had to try to orient themselves in the smoke, steam and unbearable heat, while crawling at less than six kilometres an hour toward the German lines in their highly sensitive metal crates. The tank had made its entrance on the battlefield.

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